# COMPARATIVE ANALYSIS BETWEEN DYNAMIC HIP SCREW AND CANCELLOUS SCREW FIXATION FOR FRACTURE NECK OF FEMUR

A dissertation submitted to

**THE TAMIL NADU Dr.M.G.R.MEDICAL UNIVERSITY, CHENNAI.**

With partial fulfillment of the requirements

for the Award of the degree

**MS DEGREE – BRANCH – II**

**ORTHOPAEDIC SURGERY**


**MADRAS MEDICAL COLLEGE**

**INSTITUTE OF ORTHOPAEDICS AND TRAUMATOLOGY**

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**THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY**

**CHENNAI-TAMILNADU**

**APRIL – 2017**

# CERTIFICATE

This is to certify that this dissertation titled "**Comparative Analysis Between Dynamic Hip Screw and Cancellous Screw fixation for Fracture neck of femur"** is a bonafide record of work done by Dr. VENKATESH S during the period of his Post graduate study from September 2015 to september2016 under guidance and supervision of **Professor A. Pandiaselvan M.S Ortho, D. Ortho** in the Institute of Orthopaedics and Traumatology, Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai-600003, in partial fulfillment of the requirement for M.S.ORTHOPAEDIC SURGERY degree Examination of The Tamilnadu Dr. M.G.R. Medical University to be held in April 2017.

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# DECLARATION

I declare that the dissertation entitled "**Comparative Analysis Between Dynamic Hip Screw and Cancellous Screw fixation for fracture neck of femur"** submitted by me for the degree of M.S is the record work carried out by me during the period of september2015to September 2016 under the guidance of **Prof. A. PANDIASELVAN** M.S.Ortho, D. Ortho., Professor of Orthopaedics, Institute of Orthopaedics and traumatology, Madras Medical College, Chennai. This dissertation is submitted to the Tamilnadu Dr.M.G.R. Medical University, Chennai, in partial fulfilment of the University regulations for the award of degree of M.S. ORTHOPAEDICS (BRANCH-II) examination to be held in April 2017.

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# CONTENTS

# INTRODUCTION

# INTRODUCTION

Hip fractures are common and are about 20% of the operative cases of orthopedicians. The risk of hip fractures is high and lies within range of 40% to 50% in Women and 13% to 22% in men. Intracapsular femoral neck fractures are common in the old aged after a fall. femoral neck fractures in young adults are less common. Young individuals are active and have less medical comorbidities and have better bone quality. Understanding the differences in the bony composition between elderly and young helps in treatment. Characteristic marked differences seen in the bone and vascular anatomy, the injury pattern, associated injuries in the high velocity trauma, fracture pattern, and the plan of management.

Fracture neck of femur in physiologically young people are associated with high incidences of femoral head avascular necrosis and non union. The incidence of avascular necrosis after fracture neck of femur in physiological young patients is 12% to 86%. This lead to collapse of the femoral head and arthritis of hip.The procedures like osteotomy, and other hip reconstructive surgeries have high rate of failures. Arthroplasty surgery are not ideal for the young age and more level of mechanical activity .Even though chances of osteonecrosis is there in fracture neck of femur patients who do not develop AVN have good result and quality of life.If patients

develoip AVN ,he can always undergo THR. While maintaining an anatomic reduction and stable fixation is essential, the effects of other treatment variables like the time to surgery, capsulotomy, and specific stabilisation techniques.. Knowledge of these multiple options and potential adverse effects helps in the understanding and management of neck of femur fractures in young physiological active adults.

# AIM AND OBJECTIVE

# AIM & OBJECTIVES

To study the clinical, radiological & functional outcome and complications for the fracture neck of femur treated by dynamic hip screw and cancellous screw at the Institute of Orthopaedics and Traumatology , Madras Medical College, Rajiv Gandhi Government General Hospital Chennai. during the period of year 2015 to 2016.

Selection of 30 patients. Each group of 15 patients based on inclusion and exclusion criteria. .

Radiological evaluation and follow up for functional outcome analysis.

# REVIEW OF LITERATURE

# REVIEW OF LITERATURE

**Stephen E Roberts 1998 et al** "reports the time trends in death after admission in treatment centre for fracture neck of femur during the period of year 1968 to 1998, and report the effect of demographic multiple factors on death. Analysising admitted patient statistics for femoral neck fracture, incorporating the link to mortality certificates. **Studies in** the Four counties in southern part of England.32 590 old aged 65 years orabove admitted to treatment centre with fractured femoral neck between 1968 and 1998.The study shows that Case fatality rates at 30 days, 90 days, and 365 days after getting admitted in hospital, and SMR at monthly intervals for twelve months after getting admitted in hospital. CFR decreased between the period 1960 and 1980s, but there was no fall thereafter. They increased with increasing age: for example, fatality rates at 30 days in 1984-98 increased from 4% in men aged 64-69 years to 31% in those aged ≥ 90. They were high in men than women, and in social class IV and V than in class I and II. during the first month after fracture, standardised mortality ratios in women were 16 times higher, and those in men 12 times higher, than mortality in the same age group in the general population ".[(1)]

**P. Skinner** et al "a prospective trial of 278 patients aged over 65 years, of management of Displaced sub capital fractures was randomly alloted to

closed reduction and intenal fixation with a sliding compression screw, Moore hemiarthroplasty, or total hip replacement . One year after operation there was verylittle difference between the three groupsin terms of mortality (25percent) or general complications The.revision rate within the first year was high for internal fixation(25 per cent), but many of the replacements also required (Moore, 17 per cent: Howse 12.5 per cent).

Total hip replacement resulted in the pain relief and mobility at I year, while hemiarthroplasty was worst in these respects We conclude that internal fixation and particularly total hip replacement should be given serious consideration in the management of the elderly patient with a displaced subcapital fracture".[(2)]

**Carlos Roberto Schwartsmann** et al "study the correlation between avascular necrosis and the demographics, time from fracture to surgery, reduction, Garden classi cation, and the position of the screw in use of the dynamic hip screw (DHS) in the treatment of subcapital neck fractures. Methods. A prospective study of 96 patients with subcapital neck fractures was carried out in a hospital. Patients under going surgery using closed reduction and internal fixation with DHS. Results were 58% male and 42% female patients, with a mean age of 53 years (+/−14). In terms of Garden

classification, 60% were Garden IV, 26% were Garden III, and 14% were Garden II. Nonunion was seen in three cases (3%) and was treated with valgus intertrochanteric osteotomy, leading to successful union. Avascular necrosis was observed in 16% patients. positioning of the screw into the femoral head showed a significant correlation with necrosis. Conclusions, incidence of necrosis in patients under 50 years is twice as high as that in old patients. Displacement is predictive regarding osteonecrosis and is associated with high and anterior position of the screw in femoral head. Level II of evidence. Study Type: therapeutic study".[3]

**Aaron Reuben D et al** "Intracapsular fracture neck of femur have presented challenges to orthopaedicians and remain in many way the unsolved fracture in terms of treatment and results .Intracapsular fractures are injuries that most often affect the elderly. Intracapsular fractures are rare in young with normal bone.

The incidence of intracapsular fractures is increasing due to high energy trauma with road traffic accidents.This study aims at retrospectively analysing the functional outcome of two accepted modalities of treatment in the age group 60-75 years,in Garden's type I and II fractures,namely".[4]

**Matejka J** et al "This retrospective study was designed to evaluate the severity and long term sequelae of femoral neck fractures in children in relation to the strategy and technique of management.".[5]

**Sumit Banerjee et al "**The purpose of this study was to review the principles in the management of proximal femoral fractures as reported in the literature. Methods: A medical literature search in the MEDLINE (PubMed) and Cochrane database was undertaken to review strategies and principles in proximal femoral fracture treatment. Randomized control trials and meta analysis were given preference while case reports/small series were rejected.

Results and conclusions: Early anatomical reduction and surgical fixation remains the best option to reduce complications like non-union and avascular necrosis in treating fracture neck of femur. Cancellous screws are the preferred treatment for fixation of Fracture neck of femur in young until the benefit of using sliding hip screws is validated by many large multicentric studies. Sliding hip screw (DHS) is the best option for stable inter trochanteric fractures.".[6]

**Yue-Lei Zhang**, et al "The study was to analyze clinical outcome of Pauwels grade-3 femoral neck fractures treated by different surgeries. Potential risk factors associated with nonunion and osteonecrosis of the femoral head (ONFH) were also investigated . The retrospective study comprised of 67 patients treated between January 2008 and December 2011. Patients with Pauwels grade-3 femoral neck fractures were treated by operative reduction and internal fixation. Cannulated screws (CS) were used in 46 patients, dynamic hip screw plus CS (DHS+CS) in 14, and locking compression plate (LCP) for proximal femur in 7. Reduction was assessed according to Haidukewych criteria. Postoperative radiographic examinations were conducted to check fracture healing. Fracture displacement, comminution, method of internal fixation, and the sliding effect were analyzed, regarding the incidence of nonunion and ONFH. patients had a follow-up of 21.6□±□6.0 months on average. The phenomenon of sliding effect was observed in 16 cases (23.9%).[7]

In terms of reduction , 64 cases were graded as excellent, 2 were good, and 1 was poor. ONFH was presented in 15 cases (22.4%) and non union found in 8 (11.9%), with 1 patient had ONFH and non union . Profound hip contour was preserved in 45 cases (67.2%). The fashion of internal fixation had different results regarding ONFH and non union, whereas the effects of

fracture displacement, comminution, and the sliding effect not significant. ONFH and nonunion were common complications following Pauwels grade-3 femoral neck fractures. Higher incidence of ONFH in DHS+CS and of non union in the LCP group should be noticed".[8]

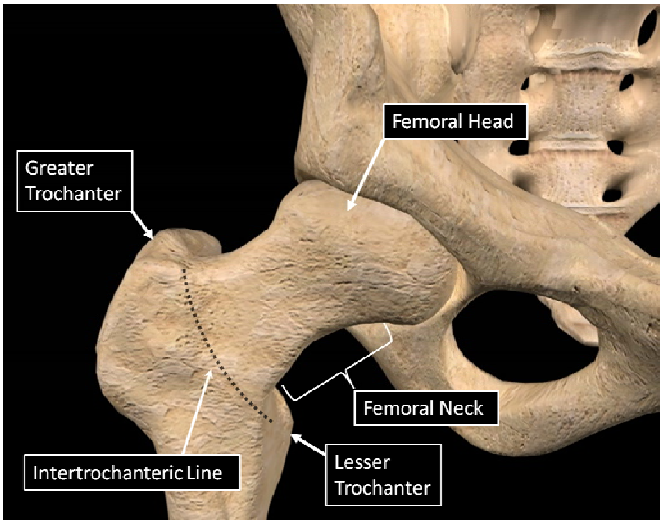
**Marc F. Swiontkowski et al "**evaluate pin/screw/plate fixation for management of femoral neck fractures, **39** proximal femurs were tested in both torsion and flexion under physiological loading .The results indicated no justification for the use of more than three pin/ screw implants for management of femoral neck fractures. Bone density correlated with fracture stability and may be a useful predictor of successful fixation".[9]

**Adam Watson et al "**Fracture neck of femur (NOFFs) are a common cause of morbidity and mortality . Minimally displaced intracapsular fractures are treated with internal fixation by a two-hole dynamic hip screw (DHS) or three partially threaded cancellous screws. Data to support the superioty are are limited. This prospective randomized controlled trial compares outcomes with these two fixation methods. This study found no difference in outcomes between DHS and cancellous screws in the treatment of subcapital NOFFs in a fit population, but found a high level of physical decline in previously fit ambulating patients. A large, multicentre trial will be needed to differentiate between these two methods".[10]

# NECK OF FEMUR ANATOMY AND TREATMENT

# ANATOMY

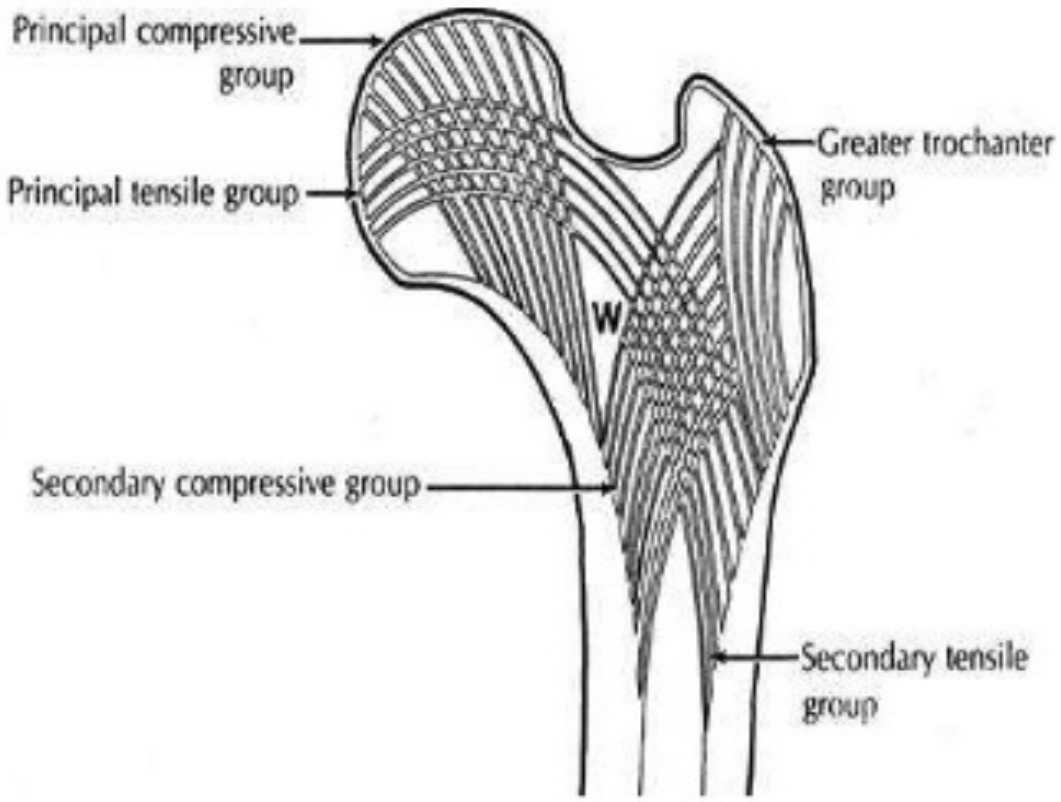
The femoral neck is flat from before behind, middle contracted and broader laterally than medial side. The vertical dimension of the lateral side is increased by the oblique dimension of the lower part which declines to join body at the lesser trochanter level, so that it averages one-third more than the Anterioposterior diameter. The medial half of the femoral neck is small and circular in shape. The anterior neck surface is perforated by multiple vascular openings. Upper junction of the anterior surface with the head is a very shallow depression, seen in old aged individuals; groove has the hip joint capsule that contains orbicular fibers .



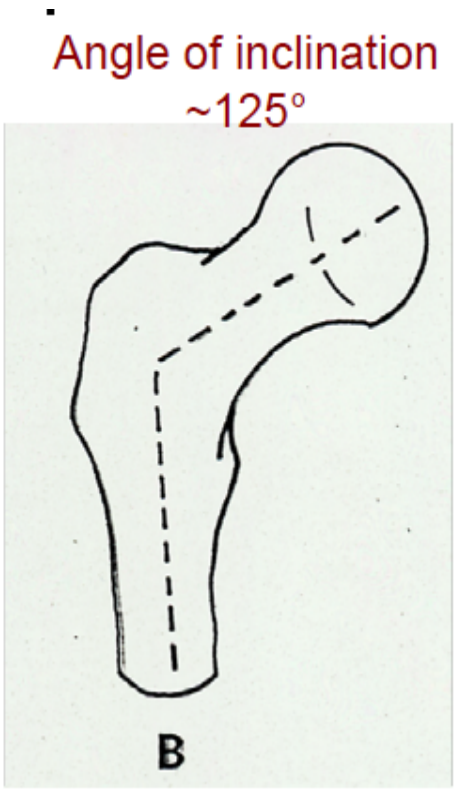

The posterior region is smooth in surface, and is wider and more concave than t anterior region. The posterior part of hip joint

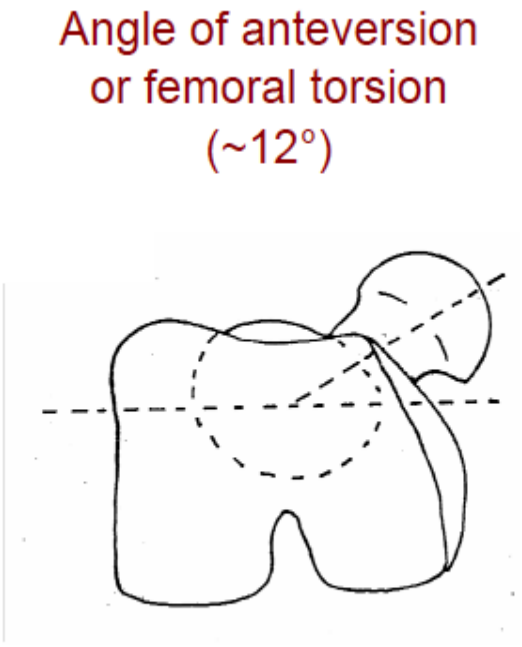
capsule is attached to it about 1 cm above the intertrochanteric crest. The superior part is shorter and thicker, and fused the greater trochanter laterally; its surface is perforated by large openings. The inferior region is long and curved behind to end lesser trochanter level.

**TRABECULAR PATTERN**



## Inclination angle

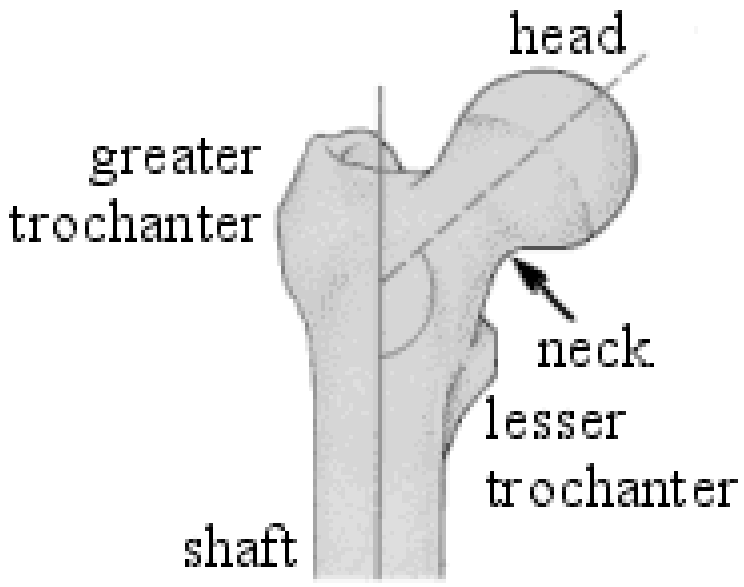



In infants, the angle is wider, and during growth it lessened . At puberty period it forms a gentle curve from the axis of the bone. In the adult period, the femoral neck makes an angle of about 125° , but varies and inversely proportional to the development of the individual pelvis shape and the stature. The angle declines during growth period, but after growth period attained it does not got change. It varies in different persons of the same age. female populations due to increased pelvis width, the femoral neck forms right angle with the body than the male. It is smaller and narrower than long bones, and when the pelvis is wider.In

projecting upward and medial ward from the femur, the neck projects forward; the amount of forward projection maychange, but an average ranges from 12° to 14°.

## Femoral Neck Angle:




Neck of femur extends inferolaterally from the head and meets the shaft of femur at an angle of around 125 degrees. This Angle varies with stature, age & width of the pelvis. When the angle is more than 135 degrees, the condition is called as coxa valga and if less than 120 degrees, condition is called as coxa vara

Femur neck is not parallel to the plane of femur and the head is located anterior to the midline of the shaft of the femur and so **anteverted.** This causes internal rotation of shaft of femur, and with

increasing anteversion the patient may walk with intoeing gait in adult period. The Neck - shaft anteversion angle is approximately between 5-15 degrees, when it is more than 15 degrees increased femoral anteversion is present and when less than 5degrees, condition is termed as femoral retroversion.

## BLOOD SUPPLY:

The femoral head is supplied by following arteries:

**Extracapsular arterial ring**

Seen at the base of the femoral neck. Ring is formed posteriorly by the large branch from Medial Femoral Circumflex Artery (MFCA), anteriorly by the smaller branches from Lateral Femoral Circumflex Artery (LFCA), and the branches from superior & inferior gluteal artery have a minor role in forming the ring.

**Ascending cervical branches**

The Ascending cervical branches give rise to the retinacular arteries which further gives rise to the subsynovial intra articular vascular ring .

**Artery of the Ligamentum teres femoris**

It may be a branch of obturator artery or MFCA. As such the artery is inadequate to supply femoral head. Only small part of the femoral head is nourished by artery of ligamentum teres.

**Epiphyseal blood supply:**

arise from lateral epiphyseal vessels that reach head posterosuperiorly and medial epiphyseal artery entering through ligamentum teres, epiphyseal arterial branches arise as arteries of subsynovial intraarticular ring.there are two groups of epiphyseal arteries: lateral group & inferior group.

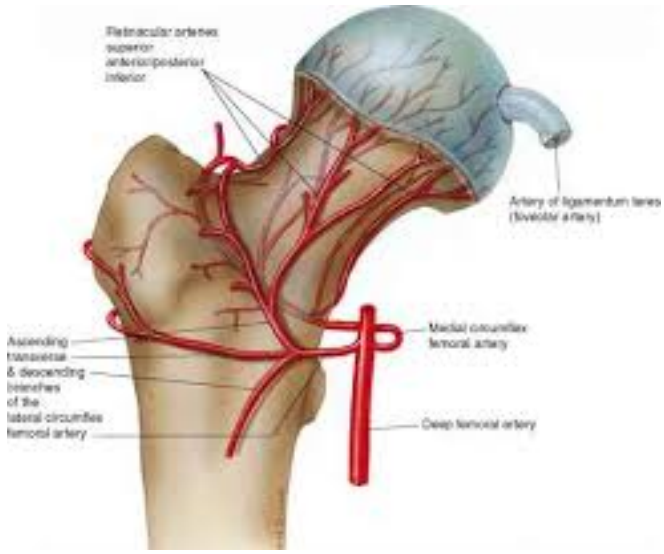
**Metaphyseal blood supply:**

The metaphysis gets its blood supply from extracapsular arterial ring, branches of ascending cervical arteries, & subsynovial intra articular ring.

**Changes with Age:**

There is minimal anastomosis between epiphyseal and metaphyseal blood vessels in the adult even after closure of epiphyseal

plate, The major blood supply to head of femur is from vessels on posterior superior surface of femoral neck.




**Retinacular Vessels**

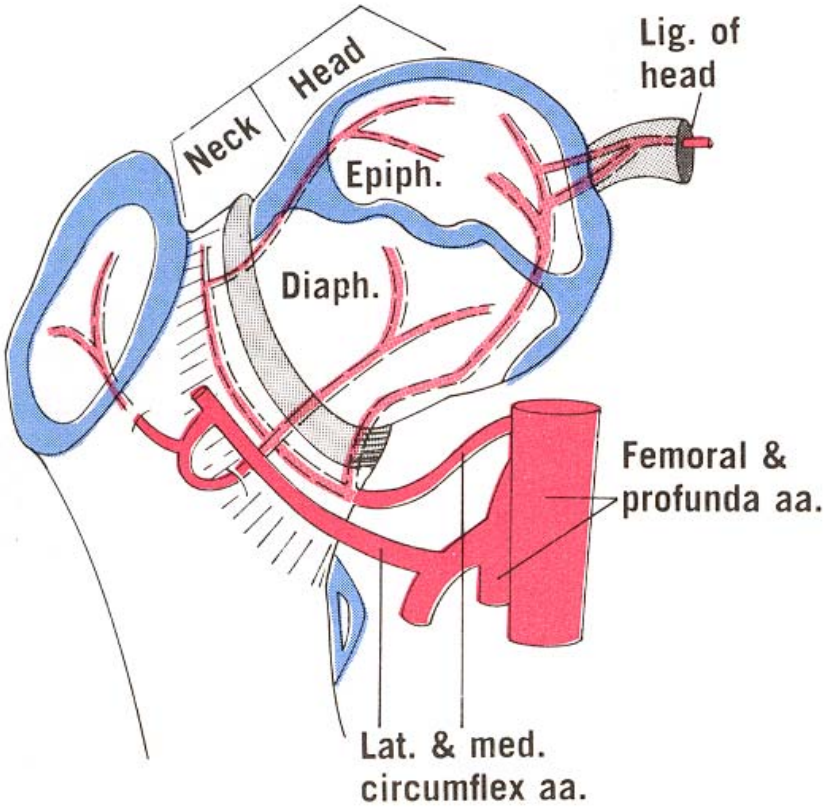
Ascending cervical vessels arise from the extracapsular ring of anastomosis seen at the base of the neck formed by the medial and lateral circumflex femoral artery. Ascending Cervical Branches ascend under the hip capsule and continue proximally along neck deep to synovial membrane towards the femoral head.

These branches ascending under the hip capsule are called as the retinacular arteries. These ascending branches are classified into 3 groups.

- Posterior inferior group } from medial circumflex
- posterior superior group } femoral artey
- Anterior group ⟶ from lateral femoral circumflex artery

At the margin of the articular cartilage along the surface of the neck of femur, these vessels form a second ring called the **subsynovial intra articlar ring** and from this ring the epiphyseal arteries arises.

## Vascular Anatomy of Head and Neck of Femur



## Intraosseous Blood Supply of Neck of Femur

The intramedullary branches of nutrient artery [arise from upper perforating arteries of the profunda femoris], metaphyseal artery [Arise from medial circumflex artery, the extracapsular arterial ring, subsynovial ring] and the epiphyseal vessels [from subsynovial ring] supply both marrow and cortical bone. In cases of fracture of neck of femur, if the fracture is complete, this supply gets disrupted.

# CLASSIFICATION OF FRACTURE NECK OF FEMUR

There are various systems for the classification of femoral neck fractures.

**Garden classification**

This classification is a system of categorizing the intracapsular hip fractures of the femoral neck. This type of fracture often disrupts the blood supply to the head of femur. Proposed by the British orthopaedic surgeon Robert Symon This is based on the degree of valgus displacement. This classification consists of four grades

- **Type I:** Incomplete/valgus impacted
- **Type II:** Complete and nondisplaced on AP and lateral views
- **Type III:** Complete with partial displacement; trabecular pattern of the femoral head does not line up with that of the acetabulum
- **Type IV:** Completely displaced; trabecular pattern of the head assumes a parallel orientation with that of the acetabulum

## Clinical relevance

The blood supply of the femoral head is more likely to be disrupted in Garden types 3 or 4 fractures. These types of fracture are treated mostly by replacing the fractured bone with a prosthesis arthroplasty. Alternatively, the fracture may be reduced to get the fragments back into a good position and fix them in place with metal screws.

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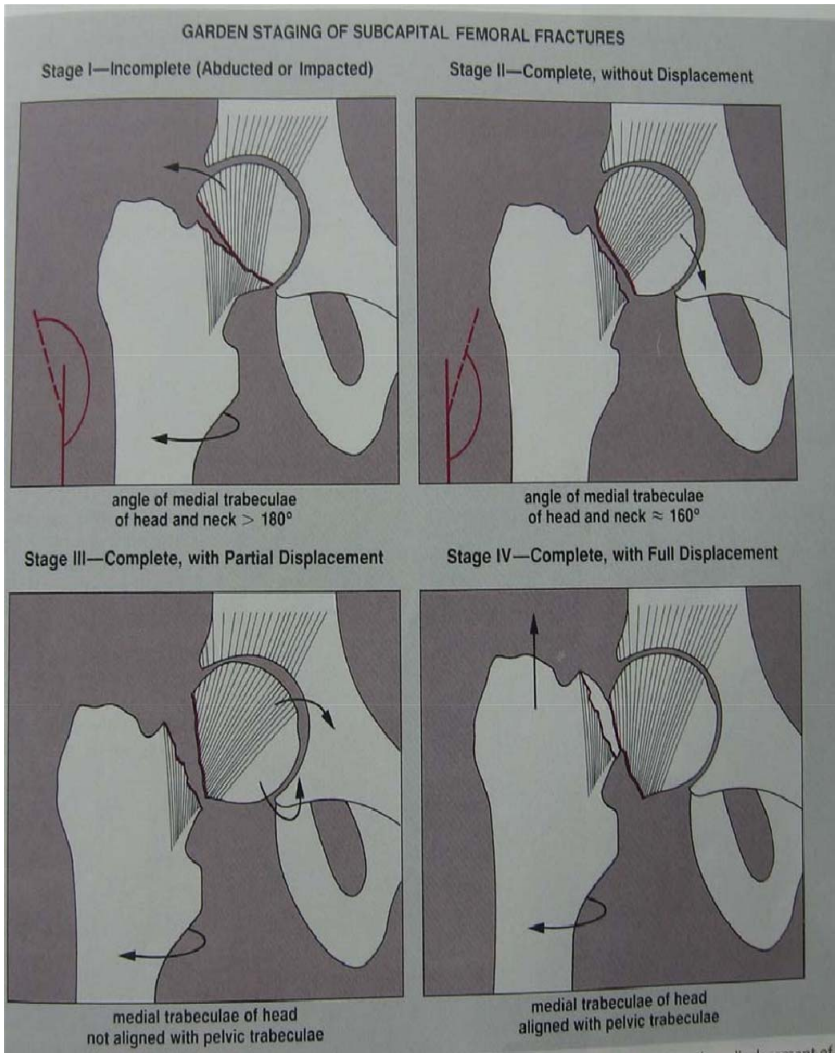
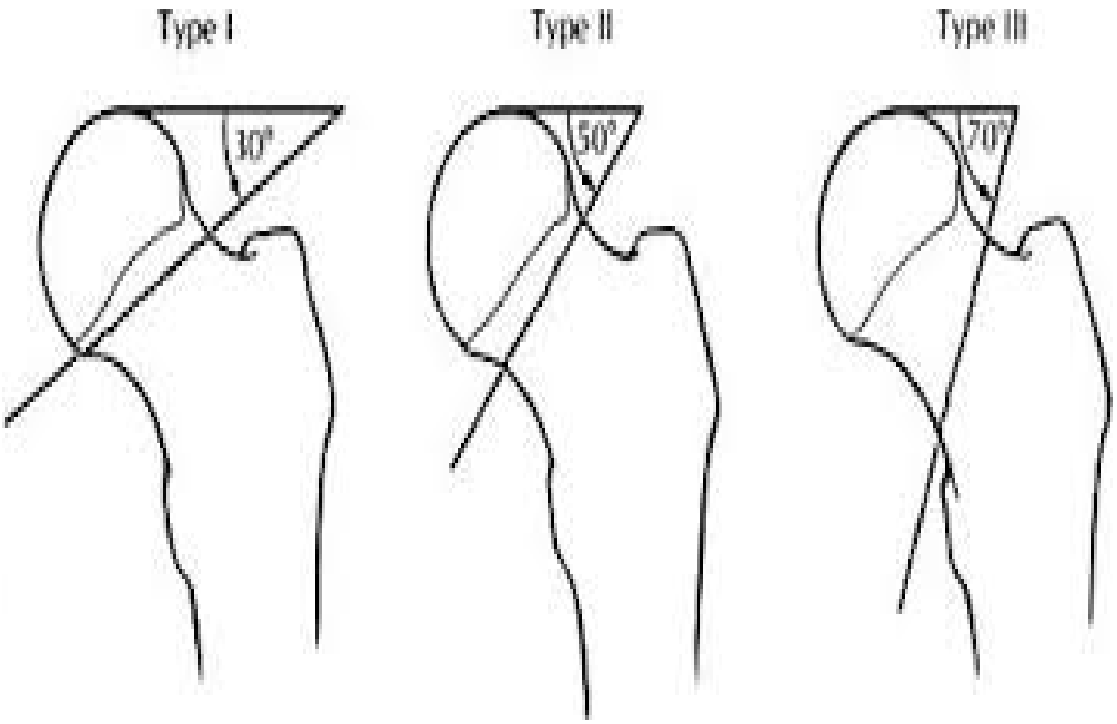


Commonly Garden 1 and 2 fractures are fixed with screws, and Garden 3 and 4 fractures are treated with arthroplasty, except in young patients where screw fixation is attempted first, followed by arthroplasty if screw fixation fails. The screw fixation is done first to preserve the natural joint since prosthetic joints ultimately wear out and have to be replaced. A serious but common complication of a fracture neck of femur is avascular necrosis. The blood supply to the femur head is easily disrupted during fracture of neck of femur or from the swelling that increases inside the joint capsule. This cuts off the blood supply and results in the avascular necrosis.

**PAUWEL'S CLASSIFICATION**

Pauwel classified fracture neck of femur according to the degrees of the inclination of the fracture line to the horizontal plane known as the Pauwels' angle. The classification consists of 3 grades. The distinction between grade II and III is often misinterpreted. Moreover, as originally pointed by Pauwels, the difference between grade I and grade II should also be based on the presence of a shearing force, which can be neutralized by impaction. Therefore, some fractures with more vertical fracture line (>30 degrees) may still be considered grade I. Similarly, the distinction between grade II and grade III fractures is based on the

presence of free torque, that distracts the upper part of the fracture line. If present, the fracture should be classified as grade III.

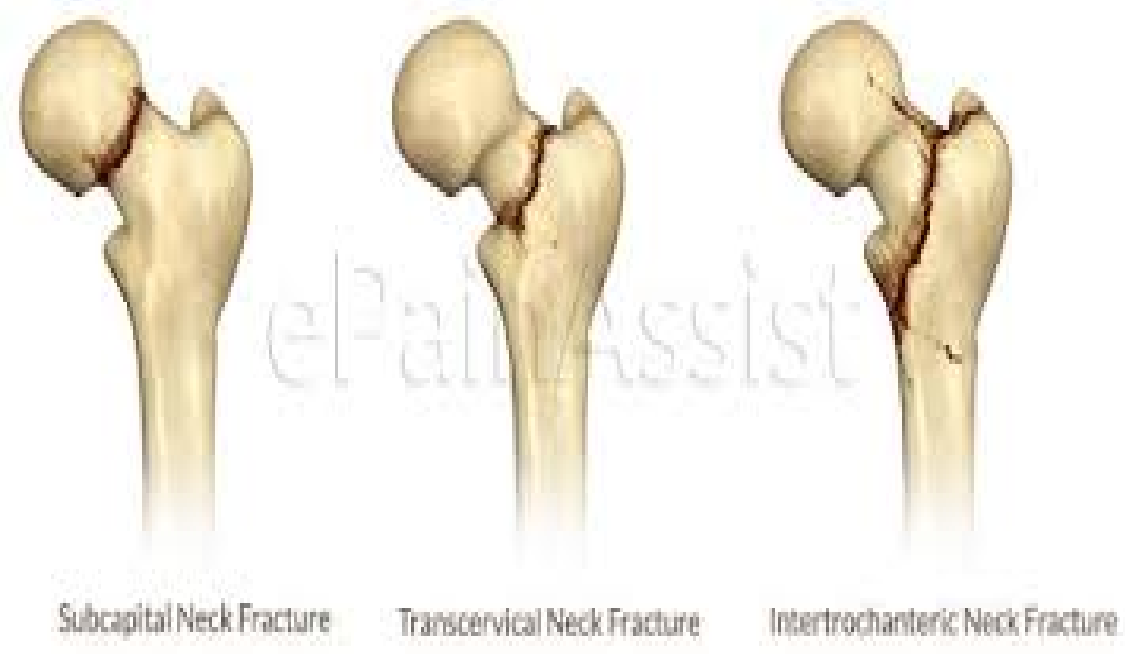



| Pauwels' Grade | Pauwels' angle |
|---|---|
| **Pauwels I** | Less than 30 degrees |
| **Pauwels II** | Between 30 - 50 degrees |
| **Pauwels III** | More than 50 degrees |

**Anatomical classification**

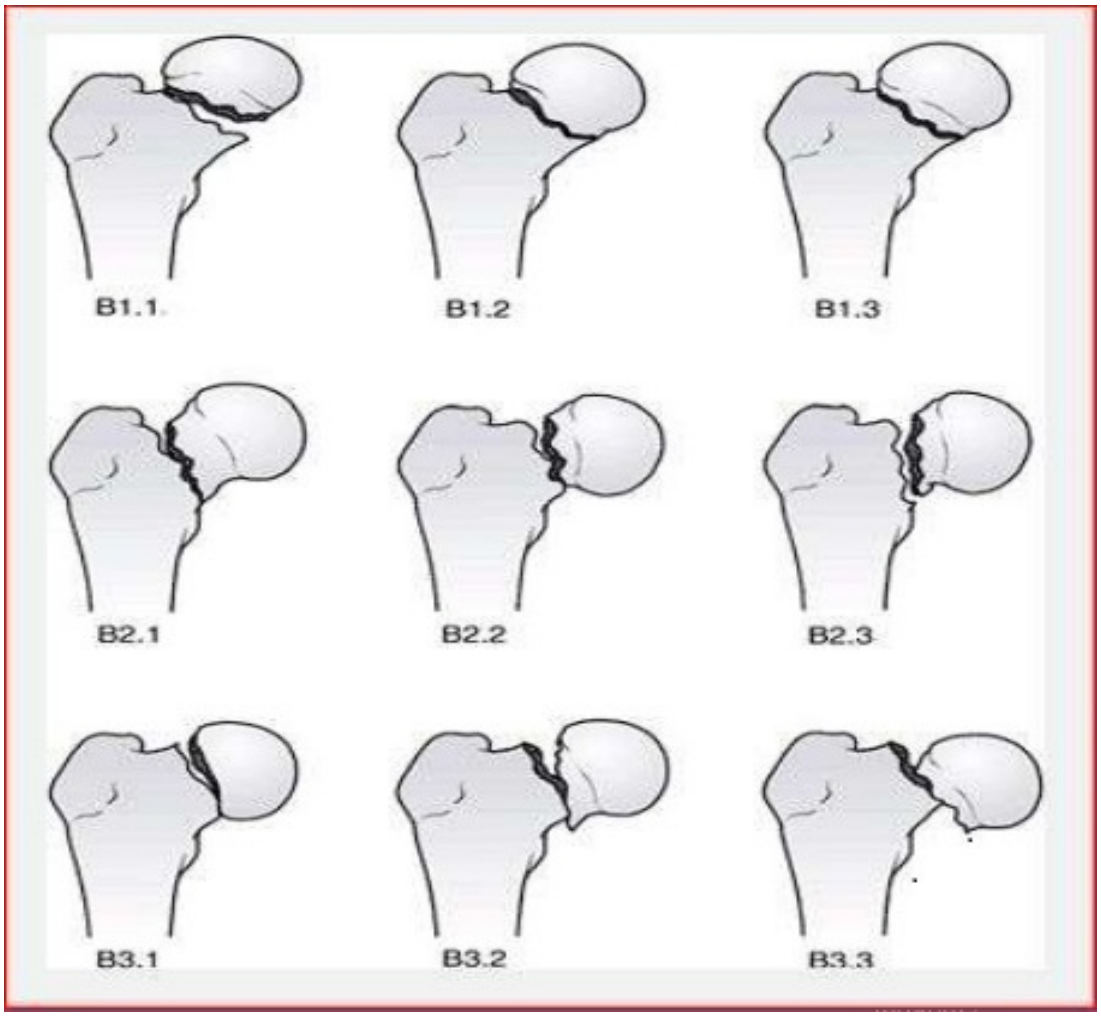
The fracture Neck of Femur are anatomically a type of proximal hip fractures i.e fractures proximal to the inter-trochanteric line. This means that All the proximal hip fractures are intracapsular fractures. These can be further subdivided as

1. Subcapital – occurring at junction of femoral head and neck
2. Transcervical – midportion of femoral neck
3. Basicervical – base of femoral Neck



## Orthopaedic Trauma Association (OTA) Classification

- B1 group fracture is nondisplaced to minimally displaced subcapital fracture
- B2 group includes transcervical fractures through the middle or base of the neck
- B3 group includes all displaced nonimpacted subcapital fractures

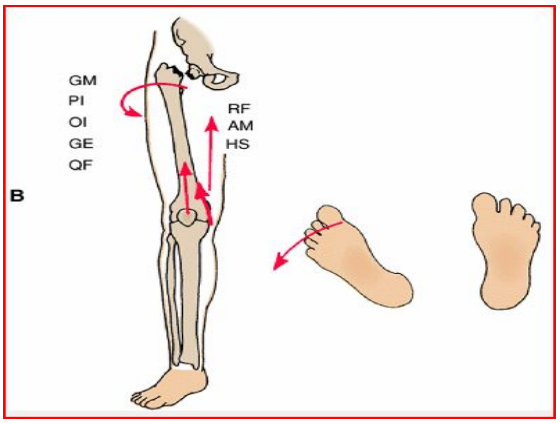


## PATHO- ANATOMY

The Fractures of neck of femur are mostly displaced with the distal fracture fragment in external rotation, abduction and proximal migration.

But These displacement are less than the displacements seen in intertrochanteric fracture. This is because the hip joint's capsule is attached to distal fragment and this prevents the extreme rotation and the displacement of the distal fracture fragment. Thus the affected leg is

- Shortened due to the displacement of the distal bone fragment proximally caused by the pull of Rectus Femoris (RF), Adductors(AM) and Hamstring muscles(HS)
- External rotation of the leg so that the foot points laterally due the action of Gluteus Maximus (GM); Piriformis (PI); Obturator Internus (OI); Gemelli (GE); Quadratus Femoris (QF);



## MECHANISM OF INJURY:

1. **Fall injury** is responsible for more than 90% of the cases seen in patients aged more than 50 years.
2. **High impact activities** in younger individuals leading to stress fracture

**Pathologic fracture** may occur at any age, including secondary deposit of malignancy, hyperparathyroidism, osteogenesis imperfecta, steroids, Pagets disease, and infection

## COMMONLY ASSOCIATED INJURIES:

- Hip dislocation
- Ipsilateral shaft of femur fracture and patella
- Chest injuries
- Abdominal injuries
- Head injuries
- Pelvic and acetabular fractures
- Associated distal radius fracture

## CLINICAL FEATURES:

### Signs and Symptoms Of A Femoral Neck Fracture

- Severe pain in hip or groin
- Difficulty in movement immediately after a fall
- Inability to bear weight on the leg on the side of injury
- Stiffness, bruising and swelling in and around your hip area
- Limb shorter on the side of injury
- Rest the fractured leg in an outward direction

**Stress fracture,** especially in younger individuals **may not have a history of fall or trauma**. The **following points need to be noted in the history**.

- Participation in repetitive cyclic activity
- Recent change in activity or equipment
- Atraumatic history
- Pain with weight bearing
- Relief of pain with rest
- Menstrual irregularities
- Predisposing osteopenia
- Insidious onset of pain in hip

## DIAGNOSIS

The Fracture  neck of femur is diagnosed by

1. **Clinical diagnosis**

- Pain: it is evident most common symptom , with pain on movements and axial compression at the hip joint and tenderness at the groin.
- Tenderness over **Triangle of Scarpa.**
- Active Straight Leg Raising Test is not possible

2. **Radiological diagnosis**

- An anteroposterior view of the pelvis with both hips **in 15 ° internal rotation and a cross-table lateral view** is indicated.

Magnetic Resonance Imaging or Bone Scan may be of use in identifying nondisplaced fractures or occult fractures that are not evident on plain radiographs.

**MRI:**

- Can be taken if there is high clinical suspicion of fracture with negative or equivocal radiological evidence.
- For occult fractures, MRI is more sensitive than a CAT scan.

- For the evaluation of bone marrow or joint space, any osteochondral injuries, for early diagnosis of Avscular Necrosis and its staging.
- But it is limited in cases of emergency settings.
- The useful sequences in MRI regarding fracture identification are coronal STIR to identify edema and coronal T1 for fracture line

## Bone Scan

- Indicated in cases where fracture or AVN is suspected but not seen on plain film, and when MRI is not available
- Bone scan has a High sensitivity and a poor specificity
- It takes atleast 4 hours to perform, and may sometimes take up to 24-48 hours . Not useful in patients with osteoporosis.

**TREATMENT**

Goals of treatment are

- to minimize patient discomfort,
- restore hip function,

- allow rapid mobilization by obtaining early anatomic reduction and stable internal fixation or prosthetic replacement.

Factors influencing the treatment

***1.Patient's Age:***

1-16 years .

16-50 years

50-60 years

> 60 years

***2. Fracture site***

Sub-capital

Transcervical

Basal type

***3. Fracture displacement*** *:Based on Garden's classification.*

***4.Fracture duration****:<21 days – fresh*

*>21 days - chronic.*

**FRESH FRACTURE**

**Age 1-16 years**

Implant used for stabilisation should not pierce the growth plate.

***Subcapital fracture:***

In undisplaced fracture fixation with two or three Kirschner wire (K-wire) . In displaced fractures - closed reduction and fixation with K-wires.

***Trans cervical fracture :***

In undisplaced fractures fixation with K-wires . In displaced fractures closed reduction and fixation with K-wires .

***Basicervical fractures :***

*In u*ndisplaced fractures fixation with 2.5 mm K-wire / cannulated cancellous screws. When screws are used for fixation; these must not cross the physeal plate.

In displaced fracture - then closed reduction and fixation with K wire. If closed reduction not satisfactory, open reduction and internal

fixation with K-wire / screws . Other options :1. McMurrays osteotomy with POP one and a half hip spica

2. abduction osteotomy and fixation with 135 angled paediatric blade plate /DHS .

Post operative protocol : skin traction for 4-6 weeks or POP hip spica .

**Age 16-50 years :**

***1. Sub-capital fracture :***

*In Undisplaced fractures* - fixation with 2-3 cannulated cancellous screws .

*In Displaced fracture* - Closed reduction & fixation with cancellous screws. Abduction osteotomy with DHS - converts shearing force into compression force . Closed reduction fixation with 2 screws.

***2. Transcervical fracture:***

*In Undisplacedfractures -F*ixation with screws / DHS.

*In Displaced fracture*- Closed reduction and fixation with 3 screws

Closed reduction is unsatisfactory ,

1. Open reduction with screws .

2. Reduction & fixation with screws and a)free fibular graft b) muscle pedicle bone graft based on quadratus femoris or sartorius or tensor fascia femoris are useful.

***3. Basicervical fracture:***

*In Undisplaced fractures - f*ixation with DHS .

*In Displaced fractures- R*eduction and fixation with DHS / cancellous screws .

**Age 50-60 years :**

***Subcapital fracture:***

*In Undisplaced fractures:F*ixation with screws .

*In Displaced fractures :Open R*eduction and fixation with screws .

If unsatisfactory , fibular graft is done .

3. Abduction osteotomy and fixation with DHS .

4. Replacement arthroplasty: Bipolar or hemiarthroplasty /THR

***Transcervical fracture:***

In Undisplaced fractures**:** Fixation with cancellous screws .

In Displaced fractures**: 1.R**eduction and fixation with screws 2. free fibular graft .

*If closed reduction is unsatisfactory*

1. Open reduction & fixation with screws and free fibular graft or bone muscle pedicle graft .

2.Replacement arthroplasty - hemiarthroplasty or total hip arthroplasty .

***Basicervical fracture:***

In Undisplaced fractures: Fixation with screws / DHS .

In displaced fractures: Reduction and fixation with screws / DHS .

**Above 60 years of age:**

**Sub-capital fracture :**

In Undisplaced fracture

1.Fixation with screws.

2. Replacement arthroplasty: hemiarthroplasty or total hip arthroplasty.

*In Displaced fractures*

Replacement arthroplasty is the treatment of choice:

Closed reduction and fixation with screws and free fibular graft may be tried.

**Transcervical**

*In Undisplaced fractures**:***

1.Fixation with screws.

2. Replacement arthroplasty.

In Displaced fractures

1.Reduction and Fixation with screws.

2. Replacement arthroplasty - - hemiarthroplasty or total hip arthroplasty.

If closed reduction fails - Replacement arthroplasty.

**Basicervical fracture**

***In Undisplaced fracture***

Reduction and fixation with screws or D.H.S

Reduction is unsatisfactory then Replacement arthroplasty.

In our study, we have compared two treatment options for fracture neck of femur.

1.cancellous screw fixation

2. dynamic HIP screw

**REDUCTION TECHNIQUE**

- Attempt closed reduction before open reduction.
- Lateral x-ray after reduction to evaluate posterior comminution.
- posterior comminution leads to the loss of a buttressing effect posteriorly, with subsequent loss of reduction and non-union.
- majority of patients with non union, have posterior comminution

  inferior comminution is also important.

  According to **Weinrobe, et al (**1998), “a non anatomic reduction will often lead to postoperative displacement”.

  **Chua, et al** (1998), “noted varus angulation is an important predictor of early fixation failure”.

- **Leadbetter Technique: (preferred technique)**

Method: Flexing the hip to 90 deg following adduction, applying traction along the line with the femur axis.Then maintaining tractioand, apply internaliy rotated 45 deg and followed by abduction and extension, maintaining traction and following internal rotation.

Reason - while flexing the hip to 90 deg (quadriped position) all hip muscles are maximally relaxed. Internal rotated hip relaxes the Y ligament , reduction is achieved, full flexion and adduction of hip joint "books open" the Fracture neck of femur site and allows the reduction

technique will continue . The leg is brought into abduction and full extension.

**Heel palm test**

**METHOD:**

The operator holds both heels of the patient in his palms with both legs in the position of abduction and internal rotation.after releasing the internal rotation, and the operator measures the amount of both feet external rotation. If the fracturefragment has more external rotation compared to the non injured side, reduction is un**satisfactory.** If the fracture sitein internal rotation, then the reduction is satisfactory**.**

If this maneuver fails, then proceed with open reduction compared torepeated attempts with greater force results in damage blood supply to femoral head.

**Closed Reduction of Hip Fracture in Extension:**

Applying a sheet around the upper thigh.

Then applying longitudinal traction, lateral traction and following internal rotation and abduction. the leg is back slowlyinto abduction.

It is also helpful to apply posteriorly directed thigh .

## WELLMERLING TECHNIQUE.

### METHODS

Patient position; supine on the fracture table with the leg in slight external rotation, traction is applied to bring the legs to equal length, and additional traction is applied to achieve more 1-2 cm of fracture distraction. The OPERATOR stands in front of the fractured limb and applies a "wrestling hold" with one forearm over injured anterior thigh near the groin and the other forearm underneath the injured thigh near the posterior aspect of the knee,then the operator hands lock together. Reduction is maintained with application of mild internal rotation, and elevation of the knee by the operator forearm (while the other forearm applies downward pressure).

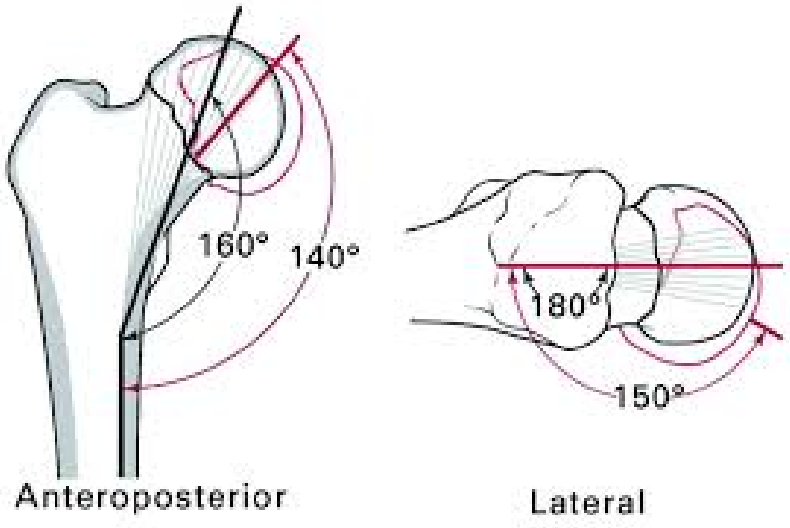
### Closed Reduction of the Hip in Flexion:

### METHOD:

Injured hip is flexed to 90 deg & traction applied along axis of the femur, thigh is internally rotated. Then leg is circumducted into abduction for maintaining internal rotation and brought down.IN complete reduction, leg will not rotate externally. problem head of femur.

**Reduction is checked by Garden alignment index**

Angle of the compression trabeculae of proximal femur on AP view relative to the longintudinal axis of the shaft of femur and the angle of the compression trabeculae of proximal femur on the lateral view relative to the femoral shaft;




AP view : angle should be 160 deg and

lateral view : angle should be 180 deg

**ACCEPTABLE REDUCTION**

It lies within range of 155-180 deg on both views;

Decreases non-union and avascular necrosis;

osteonecrosis chance is more in the following conditions

1. when index was < 155 deg / > 180 deg and incidence is 7.3% to 53.8%;

2..valgus reduction shows > 20 deg ;

## Lowell's Alignment Theory:

In x-rays, there is radiological outline of femoral head & neck junction will have convex outline of femoral head meeting concave outline of femoral neck regardless on all radiographic views;

- gives S or reversed S shaped curve;
- if outline appears like an uninterrupted C curve fracture is not reduced.it indicated closed reduction is unsatisfactory if pt is not candidate for hemiarthroplasty .use Watson Jones approach (Anterior/Anterolateral Approach).

**valgus reduction:**

If the neck of femur reduction should have neck-shaft angle between 130-150 degrees. Acceptable reduction of neck of femur fracture less than 15 deg of valgus angulation . valgus reduction will increase bony stability with posterior comminution excessive valgus ( > 185 deg - Garden angle ) may increase incidence of avascular necrosis due to damage of lateral epiphyseal vessel. valgus position can be decreased by decreasing traction.

| Very good | Good | Satisfying | Bad |
|---|---|---|---|
| AP: 160° | AP: 160~180° | AP: 150~160° | AP<150° |
| Axial: 180° | Axial: 180° | Axial: 180° | Axial≠180° |

**Varus reduction:**

If the fracture neck of femur reduced in varus position results in an non-union rate , more traction must be applied, & greater trochanter is pushed medially with heel of hand to adduct shaft of femur in relation to head of femur increase valgus position and impact the fracture at same time. Weinrobe, et al (1998), "risk of redisplacement of femoral neck fractures proportional to the offset 0f initial inferior fracture and varus angulation, non anatomic reduction will always lead to postoperative displacement".

**Angulation: (anteversion)**

If the fracture neck of femur reduction in osteoporosis patients

1.reduction shows . **0 - 15 degrees of anteversion**

**2. Reduction shows** anterior /posterior angulation of greater than 10 degrees should not be accepted.

**Apex anterior angulation: (retroversion)**

If the fracture neck of femur reduces and in the position of internal rotation & adduction oppose fracture surfaces . In the lateral view , anterior angulation apex ,posterior angulation or retroversion should be corrected by posteriorly applied force to anterior aspect of femoral shaft.

**CANCELLOUS SCREW**

**Insertion Technique**

**Supine position:**

Patient is put in supine position on the fracture table, as this the optimal position for fracture fixation assuming that a good reduction of fracture has been achieved. The advantage of fracture table is that it is easy to direct the guide pins into the femur neck and head as a image intensifier can be easily manipulated over the fracture table

**Disadvantage :**

The disadvantage of the fracture table is that, in case the fracture reduction slips, re reducing the fracture might be difficult in extended posture in the fracture table.

**Lateral position:**

A fracture table is not required for reduction and also even if reduction is lost, re- reduction can be done again.

Disadvantage is accurate reduction may not be possible and the fracture reduction may slip.

The Configuration and number of screws to be inserted is then ascertained based on the fracture reduction. .

The Guide pin is then inserted and the point and angle of insertion is checked using image intensifier.

Under Image intensifier guidance, guide-pin is drilled along the medial cortex of the femur neck & into the head to within 5 mm of the subchondral bone. Drilling is then done by using cannulated Drills upto a depth which is 5 to 10 mm short of the end of the guide pin. This is to ensure that the guide pin does not come out.

Length of the screws to be inserted, is by the direct measurement of the guide pins.

If a screw or pin needs to be replaced due to discrepancies in the measurement, a blunt tip guide pin is used to prevent joint penetration.

- joint penetration is more frequent in Garden-I fractures.
- The screws are to be fixed at the level of Subchondral bone.
- "Prevention of unrecognized joint penetration during internal fixation of hip fractures": a geometric model based on Steinmetz Solid.

**SCREW SELECTION AND INSERTION:**

- If a bone is very dense, tapping might be necessaryalong the lateral cortex
- Two screw threads are available: Short and Medium.
- Short threaded screws are usually required to achieve compression at the fracture site, hence it is necessary that all the screws have crossed the fracture line
- Screws are inserted or tightened after the traction has been released.
- The inferior screws are inserted first which is followed by the superior screws.
- When the screws reach the fracture site, the guide wires are removed to ensure that the guide pins do not cross the hip joint.

- But the screws are to be tightened simultaneously. This is to apply a uniform compression across the fracture line and to avoid tilt of the femoral head into varus angulation.
- Washers are used to increase the compression at the fracture site.

## PER-OPERATIVE IMAGES:

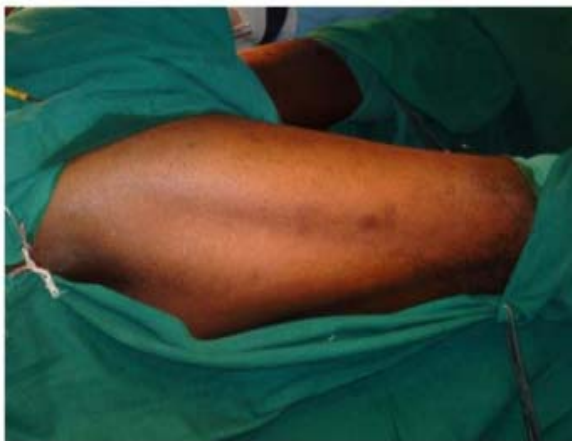


**Image showing patient positioned on fracture table and the incision being made**

**picture showing three guide wires insertion**

**cannulated cancellous screwsinserted through guide wires.**

**Three cancellous screws in inverted triangle configuration after fixation**

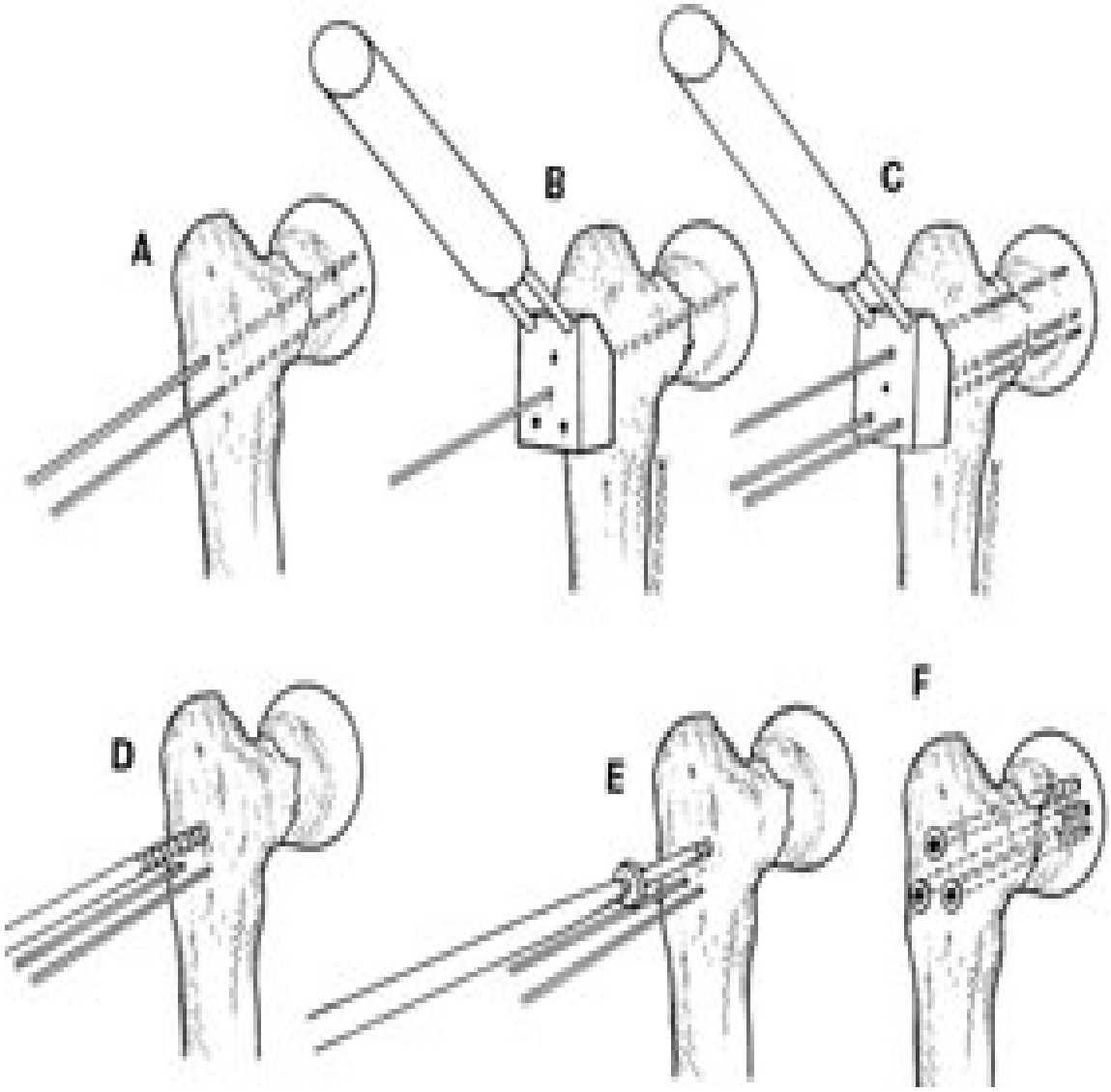
## C-ARM IMAGES

## AP view

**Lateral view**

**Impaction of fracture:**

The impaction of fracture can be done after the traction has been released by applying mallet blows over a broad bone tamp, in cases where the bone is dense. The bone tamp is placed on lateral surface of the proximal femur near the screws. Following impaction, the screws are to be tightened again. This is to maintain interfragmentary compression.


A
B
C
D
E
F

# DYNAMIC HIP SCREW TECHNIQUE

## Positioning of the patient

The patient is positioned supine on the fracture table. The ipsilateral arm is elevated in a sling and the contralateral uninjured leg is placed on a leg holder.

C-arm image intensifier control during surgery is a must.

## Reduction

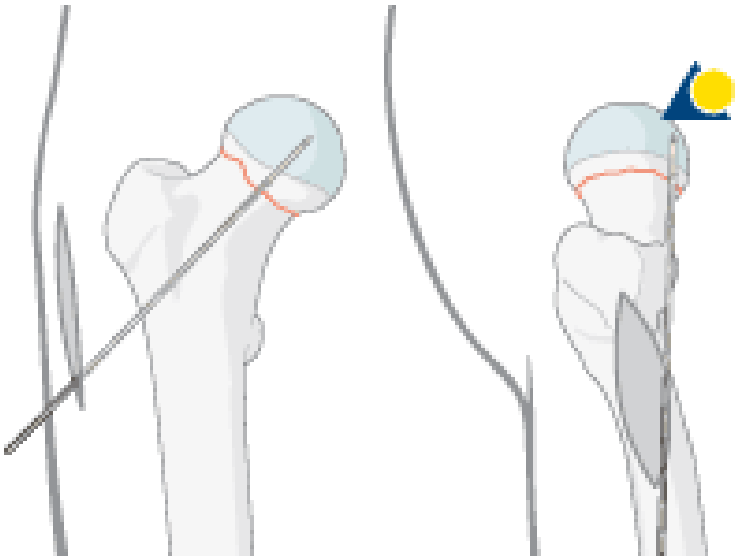
## Closed reduction

Reduction can usually be obtained with gentle traction and internal rotation of the fractured leg, carried out under image intensifier control. The reduction must be checked in both the AP and lateral view with an image intensifier.Occasionally, anteroposterior pressure applied to the thigh may help to reduce retroversion.If gentle closed reduction is unsuccessful, proceed to open reduction.The reduction should restore anatomical alignment.

**Open reduction**

If closed reduction fails, an open reduction must be carried out. The reduction of the neck fracture is carried out under direct vision.Once the capsule is opened up while applying traction the head is manipulated with hooks or K-wires, inserted to act as joy sticks until an anatomical reduction is achieved.

**Fixation with DHS**



**Technique of insertion :**

The first step is to position a guide wire on the neck and hammer it into the head. With the C-arm positioned to show the neck axis, slide the guide wire along the neck, parallel .

**Determination of the length of the DHS screw:**

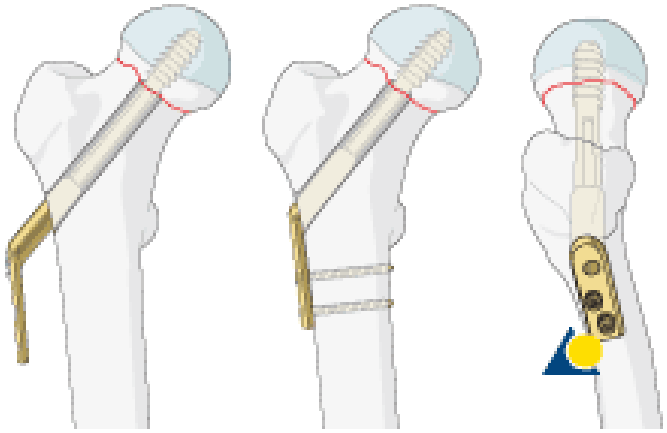
Determine the length of the DHS screw with the help of the measuring device. Select a screw which is 10 mm shorter than the measured length.

**Drilling :**

Adjust the cannulated triple reamer to the chosen length of the screw. Drill a hole for the screw and the plate sleeve.

**Screw insertion :**

The correct screw is mounted on the handle and inserted over the guide wire. By turning the handle it is advanced into the bone. Do not push forcefully or you may distract the fracture.In young patients with hard bone it is best to use the tap to precut the thread for the screw. Otherwise the screw may not advance, and you may actually displace the fracture by twisting the proximal fragment as you attempt to insert the screw.When the screw has reached its final position (checked with the image intensifier: 10 mm short of the subchondral bone in the AP and lateral), the T-handle of the insertion piece should be parallel to the long axis of the bone to ensure the correct position of the plate.

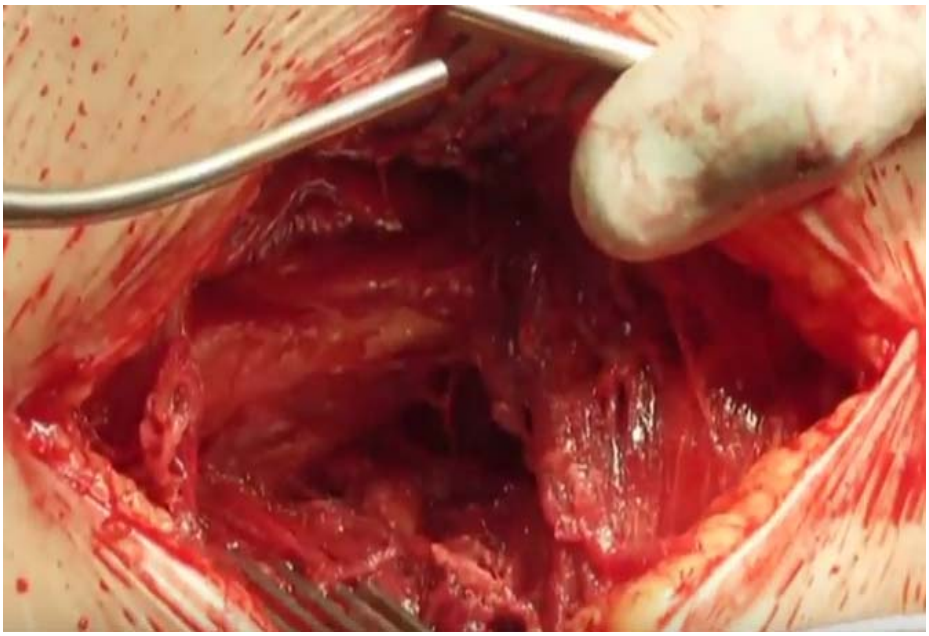


**Fixation of the DHS plate**

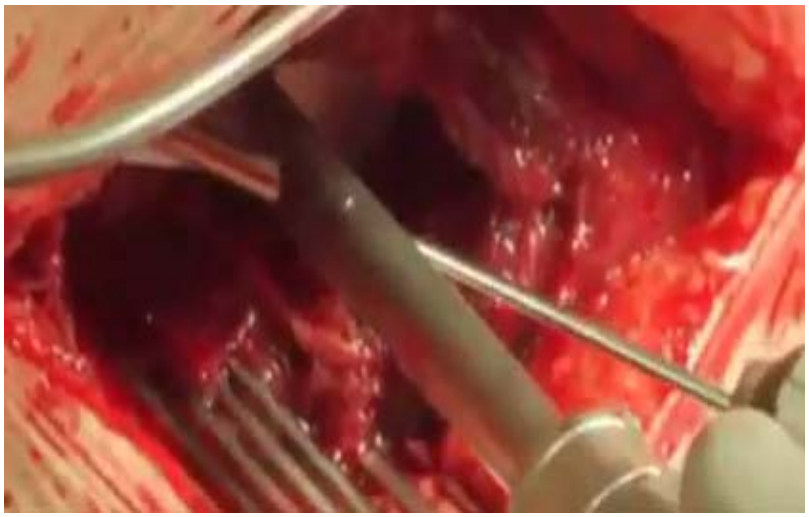
- Generally, a two-hole DHS plate with the preoperatively determined CCD angle will be chosen.
- Take the plate with the correct CCD angle, slide it over the guide wire, and mate it correctly with the screw.
- Then push it in over the screw and seat it home with the impactor.to its axis, and gently tap it into the head.
- With the C-arm in the AP, make sure that the wire subtends the CCD (collum-center-diaphysis) angle of the neck. This will help you with the insertion of the guide wire for the DHS screw.

## Per-operative images:

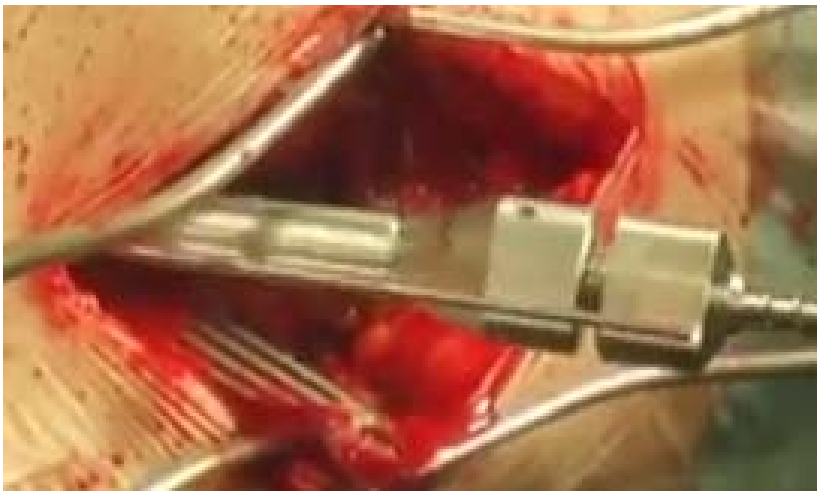
**Picture showing patient in fracture table and incision made on lateral hardinge approach**



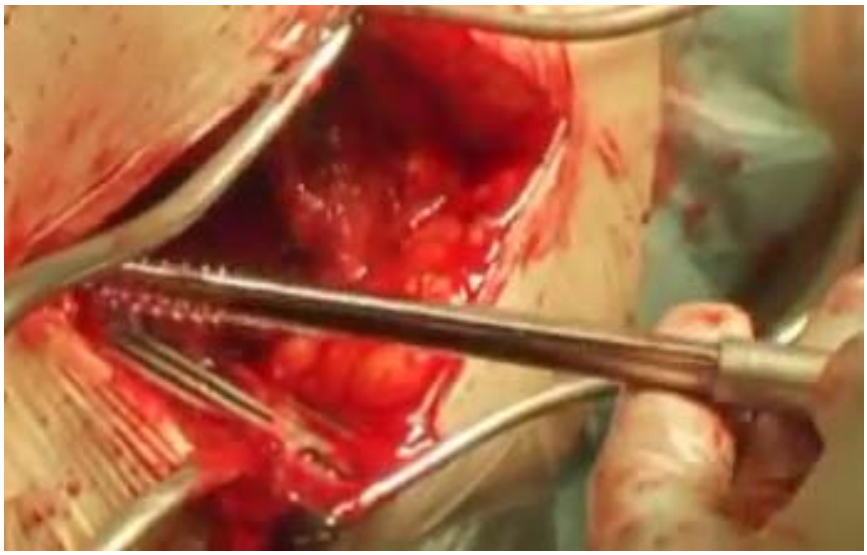
**Picture showing proximal femur after erasing vastus lateralis muscle**



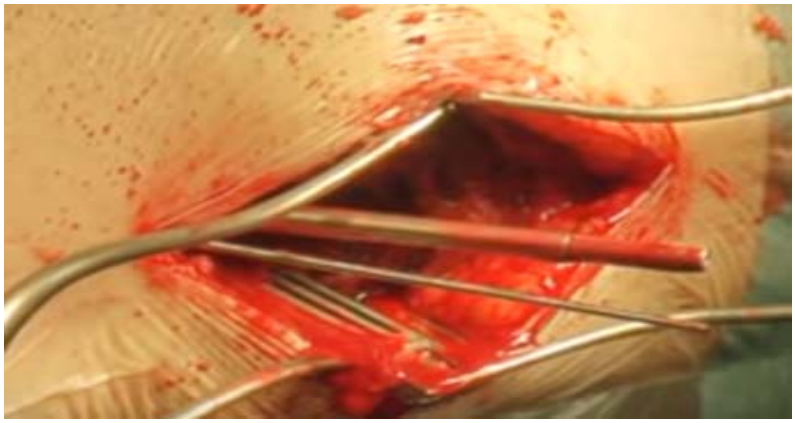
**picture showing guide wire insertion with help of 135$^{o}$ angled guide**

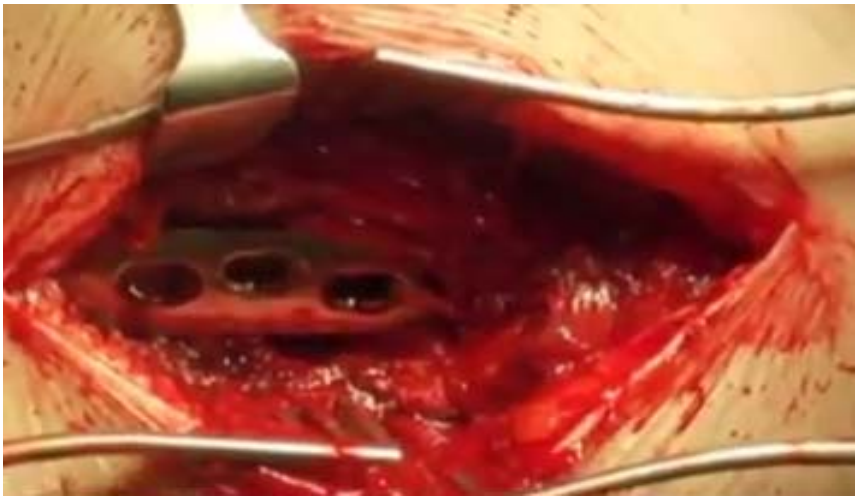


**picture shows reaming with triple reamer**

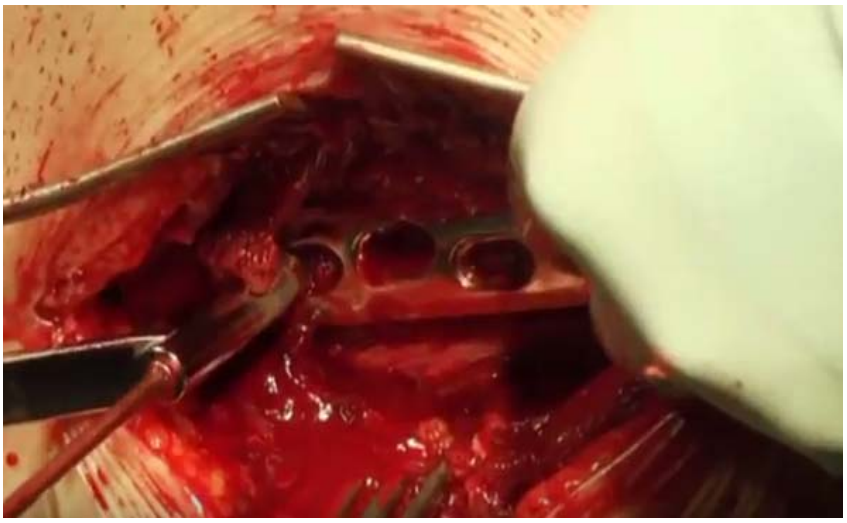


**picture showing insertion of lag screw**





**picture showing placement of barrel plate**



**picture showing insertion of cortical screws**

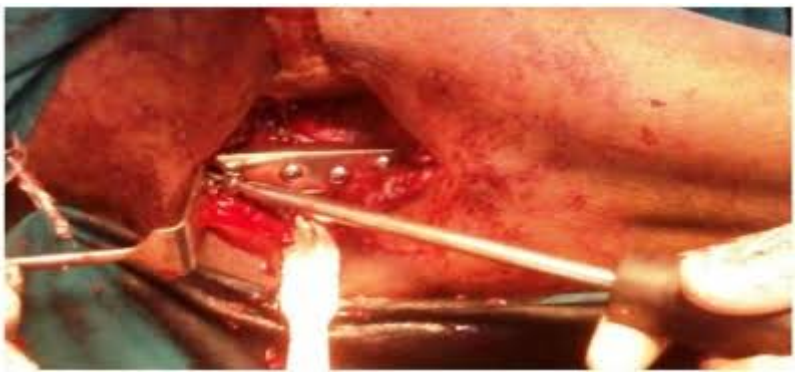


**Image showing fracture fixed with DHS and head compression screw being applied**

# C-ARM IMAGES:

**AP view** **LATERAL view**

**Image intensifier shows fracture neck of femur reduced and stabilized with Dynamic hip screw**

# COMPLICATIONS

## Cardiac complications

The main reasons of in-hospital cardiac related mortality after hip fracture are **heart failure and myocardial ischemia,** which normally come out c after fracture in patients with previous heart affectation. The general incidence of perioperative myocardial ischemia in aged patients suffering hip fracture surgery has been informed to be 35% to 42%.

**Deep venous thrombosis (DVT)** is one of the principal causes of perioperative morbidity and mortality. In lack of thromboembolism prophylaxis, the prevalence of venography-detected proximal DVT ascend to 27% of patient. The incidence of fatal **pulmonary embolism** oscillates between 1.4% to 7.5% of patients within 3 mo of hip fracture surgeryThromboembolism prophylaxis reduces the rate of DVT by approximately 60%. Regional anesthesia significantly reduces as well these complications, probably in relation with its capability to generate peripheral vasodilatation and to maintaining venous blood flow in the lower extremities, as well as to promote a local inhibition of platelet aggregation and stabilization of endothelial cells

## Pulmonary complications

Postoperative pulmonary complications (PPCs) were defined as anomalies of the lung resulting in an identifiable disease with adverse impact in the clinical course of the patient. They are quite common (4% of patients) and suppose an increase length of stay, morbidity and mortality, in patients who had undergone hip fracture surgery, exacerbation of chronic lung disease, atelectasis, respiratory failure, pneumonia, pulmonary thromboembolism and acute respiratory distress syndrome.

## Urinary tract complications

The most common postoperative urinary tract complications after hip surgery are urinary retention, urinary infections and acute kidney injuries. **Urinary tract infections** are the leading cause of nosocomial infection and affect 12% to 61% of all patients with hip fractures. Urinary tract infections are considered an important delirium factor risk, and are responsible to prolong the hospital stay for another 2.5 d and even a higher mortality rate. Urinary catheters are the single most important risk related to this type of postoperative infection. Therefore, indwelling catheters should be preferably removed within 24 h after insertion.

## Endocrine-metabolic complications

**Diabetes,** either type 1 or 2, is frequent in patients with hip fracture. In fact, type 2 diabetics are 70% more likely to suffer this type of fracture. Diabetes decompensation is a quite common preoperative complication of patients that undergo hip fracture surgery.

## Other complications

**Pressure sore** result from an imbalance between extrinsic mechanical forces acting on skin and soft tissue, and the intrinsic susceptibility to tissue to collapse. Acute hip fractures are their most frequent causes. Close to 35% of decubitus ulcers occur at the conclusion of the first week of hospitalization.

Risk factors of pressure sores include age, malnutrition, history of smoking and systemic illnesses. The use of foam or alternating pressure mattresses, special beds and equipment to relieve pressure, aggressive skin care, nursing focused on prevention, and good nutrition help prevent the evolution to ulceration.

**SURGICAL COMPLICATIONS:**

Complications arising from hip fracture surgery are fairly common, The main problems in intracapsular fractures are biological: vascularization of the femoral head, and lack of periosteum -a major contributor to fracture healing- in the femoral neck. In extracapsular fractures, by contrast, the problem is mechanical, and relates to load-bearing.

There are

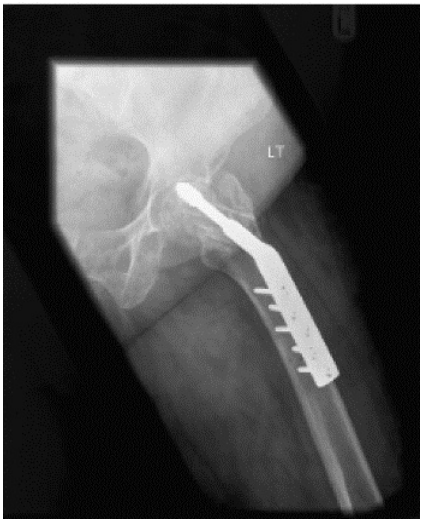
1 infection

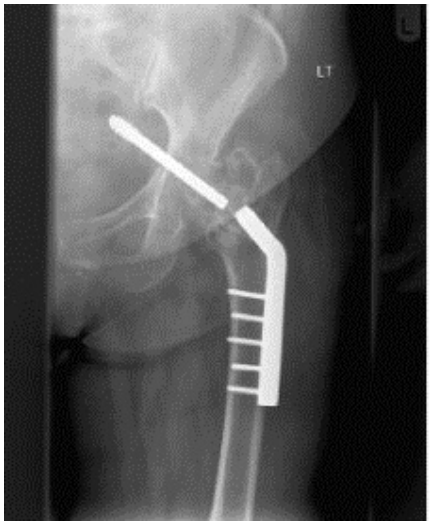
2 implant failure

3 nonunion

4 avascularnecrosis

**screw penetration**



## NON UNION

Factors influencing the appearance of non-unions include patient age, degree of displacement, fracture line, degree of comminution and quality of reduction; non-unions are reported in between 10% and 45% of patients undergoing osteosynthesis[

Femoral neck fractures occur in younger patients, frequently as a result of high-energy trauma. Prognosis is worse in younger patients **Dedrick et al** reviewed 32 cases of femoral neck fractures in young adults and found 20% nonunion and 36%avscular necrosis. Individuals extreme force is required to produce fracture which explains the increased incidence of AVN & nonunion. In underdeveloped countries because of lack of facilities these delayed presentation or nonunion is common.

### Definition of non union

**Minimum 9 months has elapsed after** injury & no progressive sign of healing for 3 months

### Delayed presentation(Late presenters)

· 3weeks to 3 months termed as late presenters

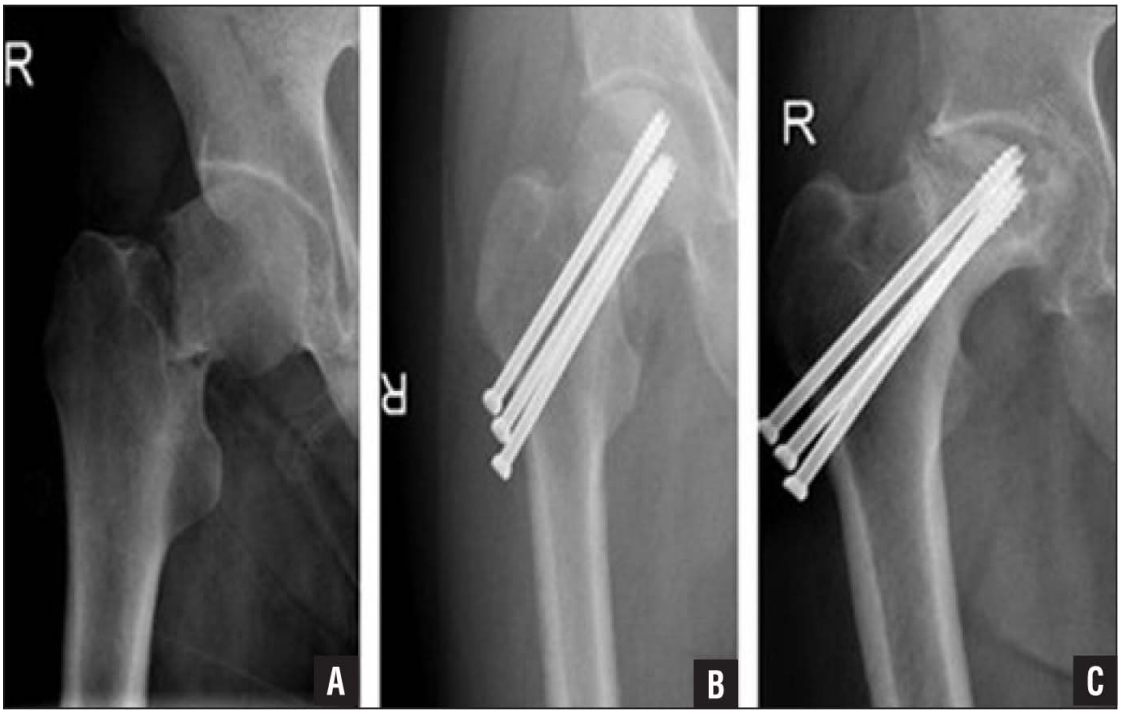
· Unique problem specially in our country

· Neck gets absorbed and limb becomes short

**Causes problems in management (Meyers 1974)**

- Absence of cambium layer of periosteum of femoral neck leads to decrease in the healing potential(Phemister, 1939)
- Continuous Synovial bathing
- High velocity trauma in young adults
- Inaccurate reduction
- Unsound or loss of fixation
- Vascular insufficiency
- Posterior comminution
- No treatment

## Avascular Necrosis



Avascular necrosis of the femoral head occurs in 9%-18% of patients, between two and eight years post-fracture; risk factors include the degree of fracture displacement, patient age and delay in surgical treatment. Nonunion and avascular necrosis of the femoral head or a combination of both is the main complication following fractures of the femoral neck. In spite of improved operative techniques, nonunion is still reported in 10-20% of cases.

The reason is a combination of unfavorable biomechanical and vascular conditions caused by the fracture itself, ignoring general contraindications, poor reduction and inadequate internal fixation. Usually there is shortening in the fracture, which limits the indication for simple refixation, the least radical

operation.

## POST OPERATIVE PROTOCOLS AND FOLLOW UPS

1. Nonweight bearing with crutches or walker for at least six weeks after discharge,
2. Partial weight bearing till radiological union.
3. Full weight bearing after radiological union, based on individual clinical condition is usually followed.

Patients were followed at 1, 2, 3, 6, and 12 months after surgery. AP and lateral X ray films are taken at each follow-up for evaluations of fracture healing, implant position, and the general condition of the hip joint.

The results of fracture fixation can be interpreted using Harris Hip scoring system and statistical data can be obtained using statistical tests of significance. Software SPSS can be used to obtain these results for academic interests.

**Harris hip scoring system:**

This scoring system is investigated under following domains:

- Pain – subjective pain, and its effect on Activities of daily living is assessed.
- Limp, Support, Distance walked – to assess the gait subjectively.

■ Sitting, Public transportation, Stairs, Putting on shoes and socks – to evaluate the degree of impairment due to hip articulation symptoms.

■ Absence or presence of deformity – any hip flexion, adduction, internal rotation deformity and limb length discrepancy is assessed

■ Range of motion scale – the normal values are:

- Flexion: 140 degrees;

- Abduction: 40 degrees;

- Adduction: 40 degrees;

- Internal rotation: 40 degrees

- External rotation: 40 degrees;

**Harris hip score grading**

The higher the score, the better the results and lower the dysfunction.

■ Pain – 1 item, has scores ranging from 0 to 44;

■ Function – 7 items, scores ranging from 0 to 47;

■ Deformity – 1 item, score either 0 if deformity is present or 4 if no deformity;

■ Range of motion – 1 item, scores ranging from 0 to 5.

Depending on the results of these scores, there are 4 categories of hip status:

- score less than 70 indicates poor hip outcome;
- score between 70 and 79 indicates fair hip outcome;
- Score between 80 – 89 indicates good hip outcome;
- Score between 90 – 100 indicates excellent hip outcome.

# MATERIALS AND METHODS

# METHODS AND MATERIALS

This is a prospective and retrospective study of 30 patients fracture neck of femur– 15patients treated with dynamic hip screw and 15 patients treated with cancelous screw fixation. The study was done after getting clearance from Hospital ethical committee.

Those who fulfilled the inclusion criteria given below, were invited to participate in the study. Informed consent was obtained from all the patients willing to take part in the study

- **Inclusion Criteria:**

- Acute Fractures less than 3 weeks
- Non comminuted fractures
- Age above 16 yr and <70 years
- **Exclusion criteria**

  Age > 70 years and age < 16 years

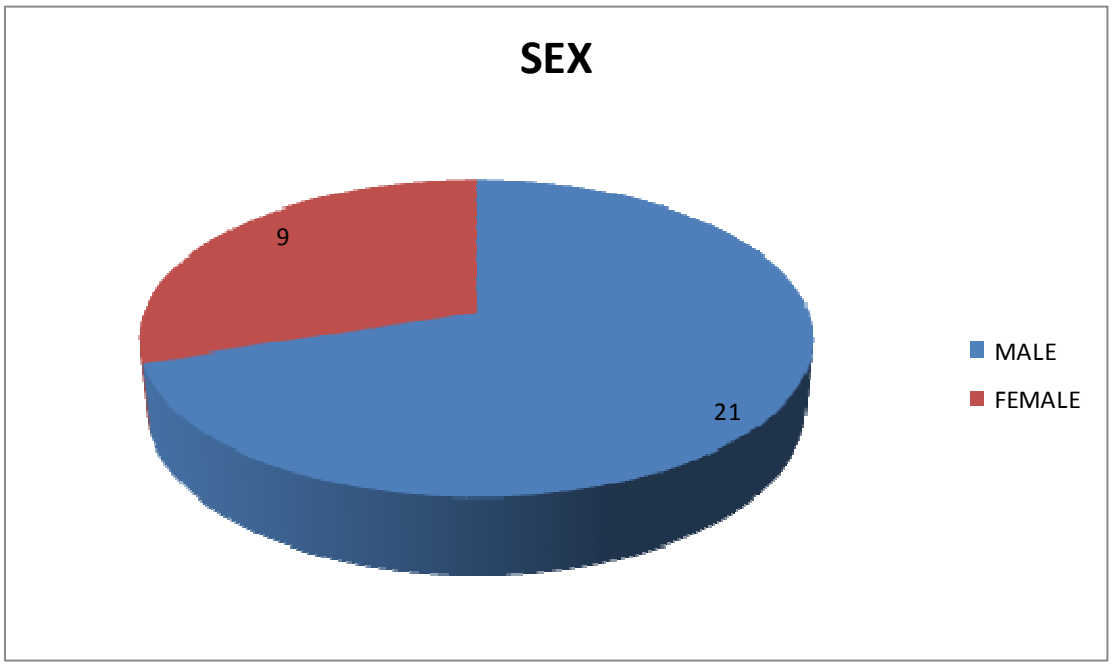
- Fracture duration greater than 3weeks

## Study analysis

In our study, there are several parameters are analysed.there are

## Sex

In our study analysis, out of 30 patients,21patients 70% are males and 9 patients 30% are females.In dhs treated 15 patients there are 10 patients66.7% are males and 5patients 33.3% are females. In cancellous screw 15 treated patients,there are 11 male 73.3% patients and 4 female patients26.7%.



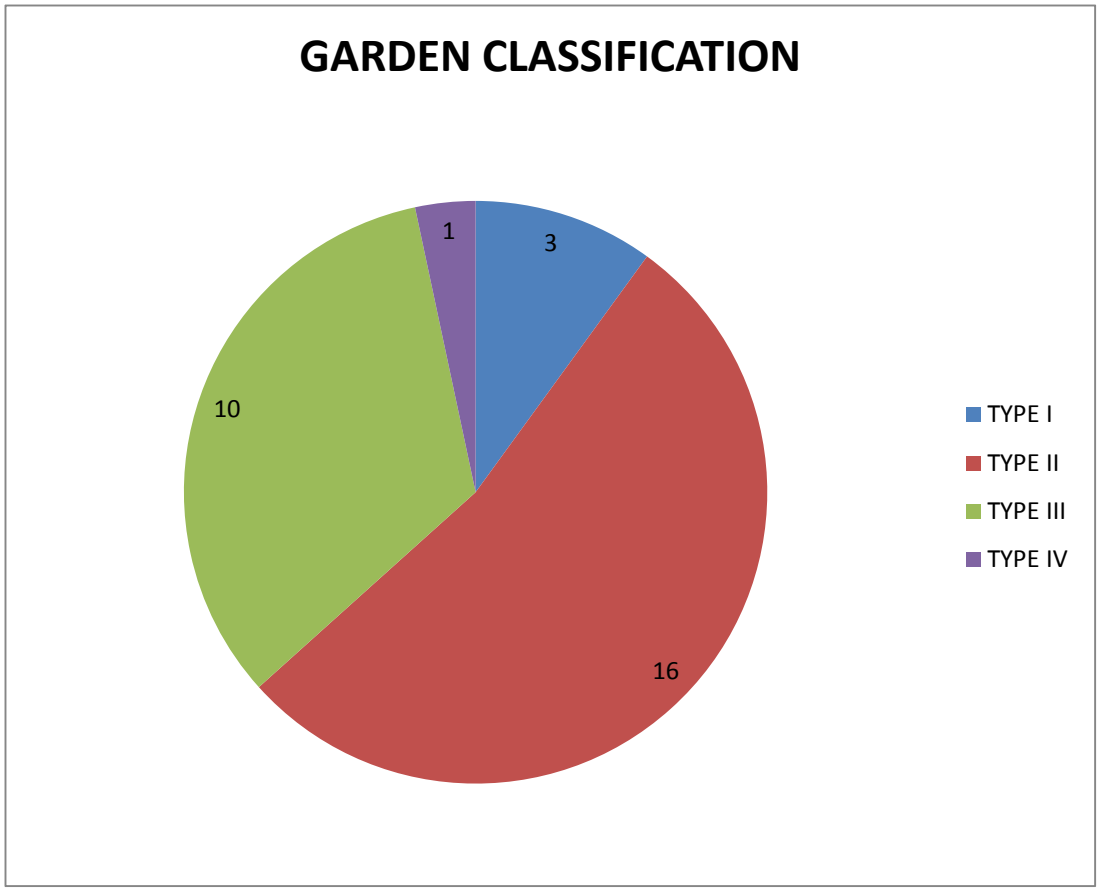
# GARDEN CLASSIFICATION.

In our study there are gard type 1 are 3 patients10%. Of which 1 patients 6,7% dhs treated and 2 patients 13.3%are ccs treated.

Gard type 2 are 16 patients53.3% .of which 7 patients 46.7% are dhs treated and 9 patients 60%are ccs treated.

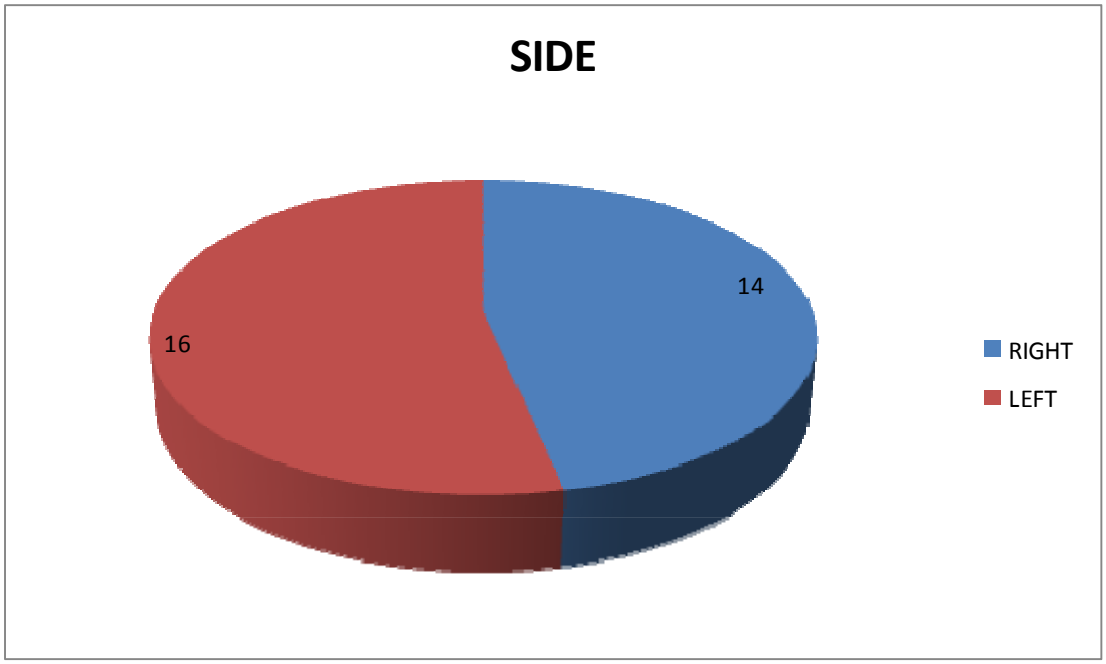
Garden type 3 are 10 patients 33.3%.of which6 patients 40.7% were dhs treated and 4 patients 26.7% are ccs treated

Garden type 4 are 1 patient 6.7%.of which patient 6.7% was DHS treated.



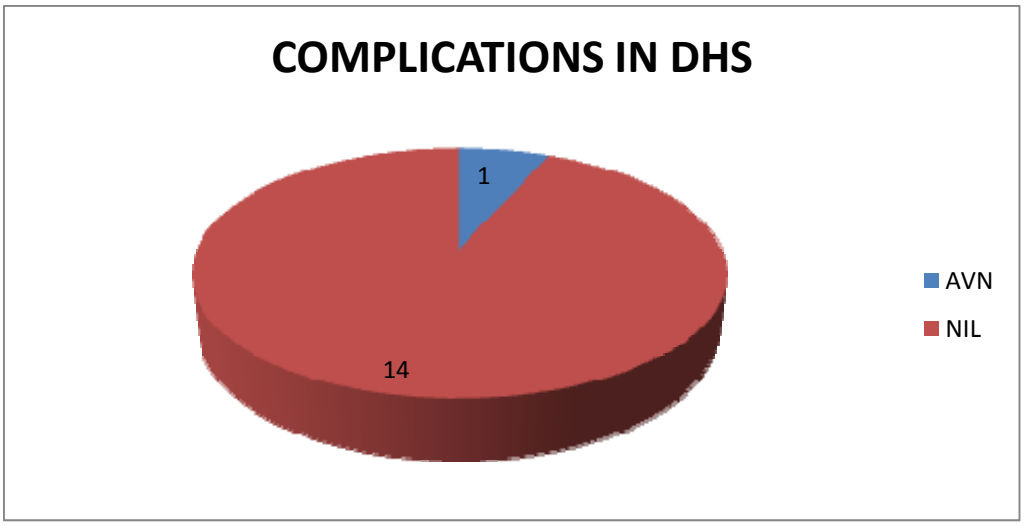
**SIDE:**

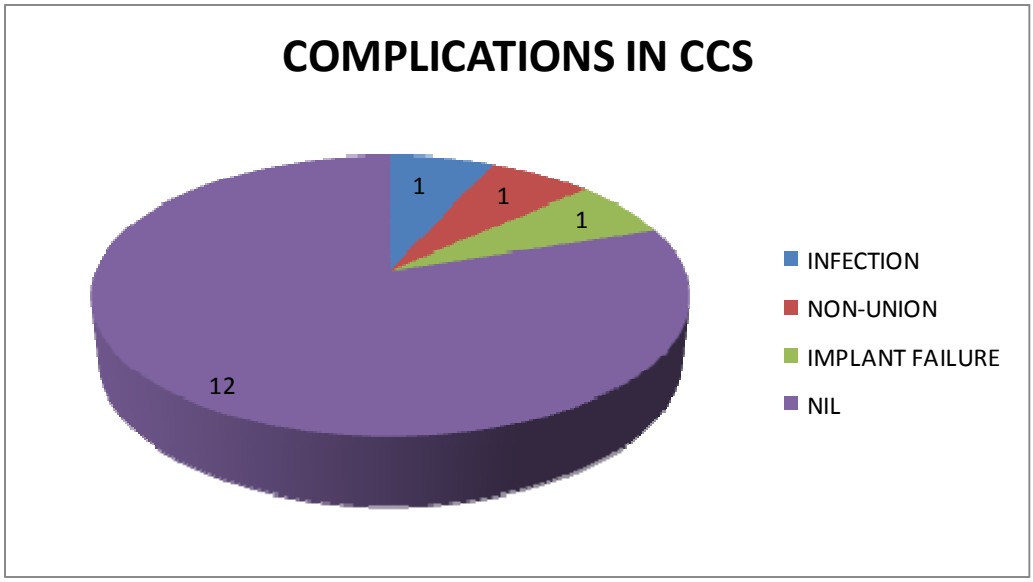
In our study analysis, out of 30 patients,14patients 46. 7% are Right sided treated and 16 patients 30% are left side treated.In dhs treated 15 patients there are 5patients33.7% are right side and 10patients 66.7% are left sided. In cancellous screw 15 treated patients,there are 9 patients 60% are right sided and 6 patient 40%s areleft side treated.



## COMPLICATIONS

In our study analysis, out of 30 patients,4patients13.2% got complications and 26 patients 86.3% got outcome without complications.In dhs treated 15 patients there are 1patient6.7% got complicated and 14patients 93.7% got outcome without complications. In cancellous screw 15 treated patients,there are 12 patients 80% got outcome without complications and 3patients20% got complications.






In our study there are 30 patients.

12patients41.4%.got excellent results.

10 patients33.3% got good results .

4 patients 13.3%got fair results

4 patients 13.3%got poor results..

**IN DHS TREATED PATIENTS,**

8 patients 52.4%got excellent results

4 patients 26.7% got good results.

2 patients 13.3% got fair results.

1 patient6.7% got poor results.

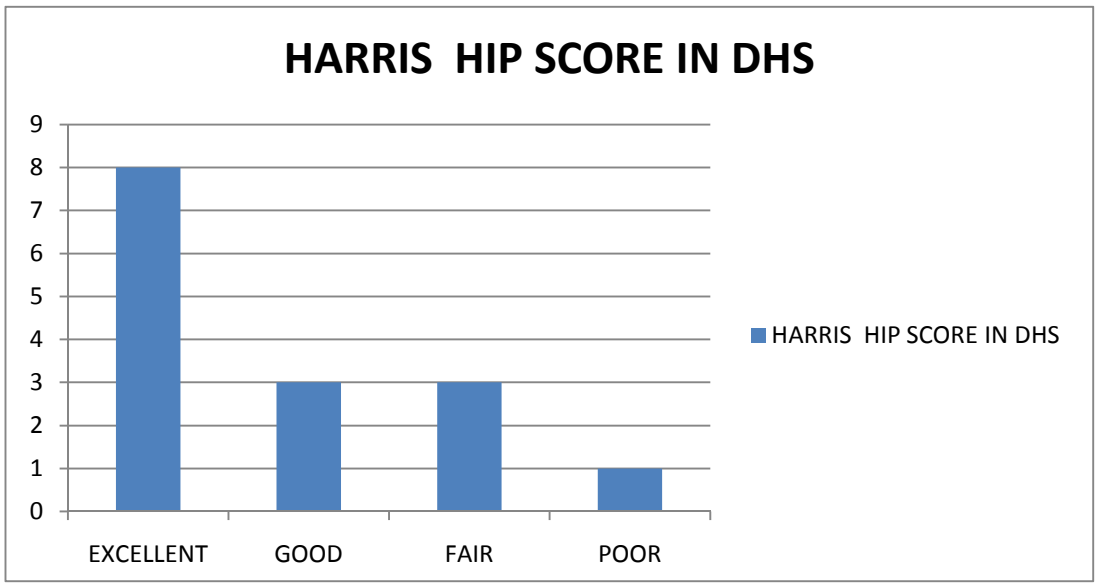
**IN CANCELLOUS SCREW TREATED PATIENTS**

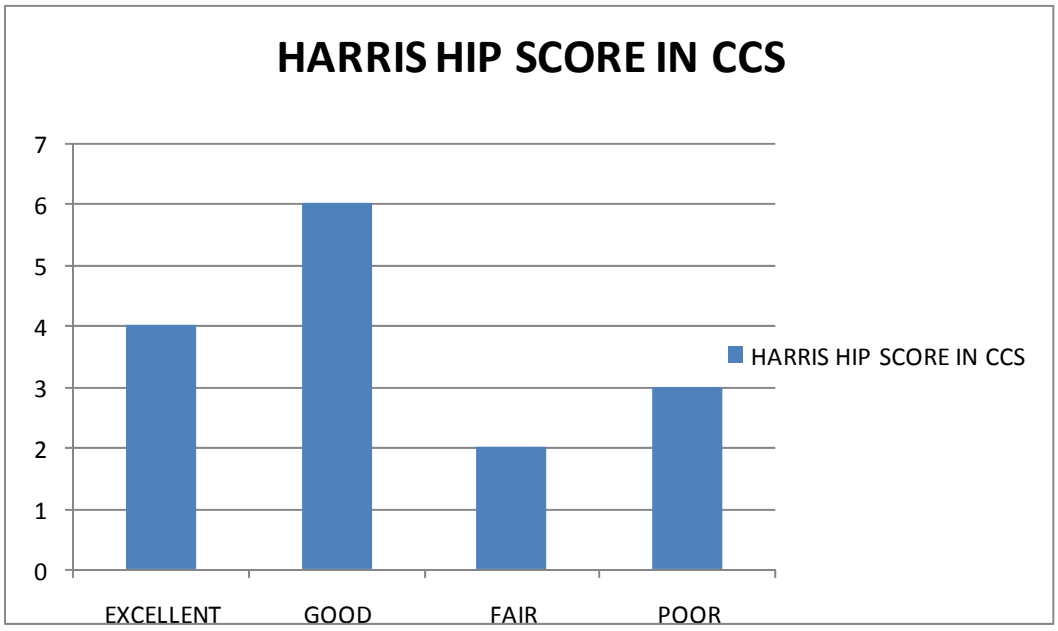
4 patients26.7% got excellent results.

6 patients40% got good results

2 patients13.3% got fair results.

3 patients20% got poor results.



# RESULTS COMPARISION

# RESULTS COMPARISON

In my study

There are 30 patients.

| AVERAGE | CANCELLOUS SCREW FIXATION | DYNAMIC HIP SCREW |
|---|---|---|
| AGE | 38years | 43years |
| TIME OF INTERVAL | 14days | 15days |
| TIME OF UNION | 13.5weeks | 13.8weeks |
| FOLLOW UP PERIOD | 9months | 10months |
| HARRIS HIP SCORE | 77 | 87 |

In our study, we selected 30 patients based on inclusion and exclusion criteria. Of which 15 patients treated with DHS and another 15 patients treated with CCS fixation and in study analysis there were several parameters included to compare outcome analysis, of which

p value was significant in the following parameters

1. Complications and

2. Harris hip score and outcome analysis.

It shows that there is significant decrease in the complicationrate and increase in the functional outcome based on harris hip score for patients treated with DHS when compared with patients treated with cancellous screw fixation.

P value is not significant in the following parameters.

1.healing time

2.time of interval between injury and surgery

It shows that there is no signicant difference in healing time between both groups .

The following parameters are not showing significant influence in functional outcome are SEX and SIDE OF INJURY.

| OUTCOME | CANCELLOUS SCREW FIXATION | DYNAMIC HIP SCREW |
|---|---|---|
| EXCELLENT | 4 | 8 |
| GOOD | 6 | 4 |
| FAIR | 2 | 2 |
| POOR | 3 | 1 |

# DISCUSSION

# DISCUSSION

In our study, we selected 30 patients with fracture neck of femur from my institute. Out of 30 patients, 15 patients underwent operative procedure in the form of reduction and internal fixation with cannulated cancellous screw and the other 15 patients underwent reduction and internal fixation with dynamic hip screw.

Of the 15 patients treated with cancellous screw fixation, 4 patients had excellent results with good range of movements without pain and deformity based on Harris Hip Score, 6 patients had good results with good range of movements and mild pain without restriction of daily activities, 2 patients had fair results with mild limp which is non-progressive and 3 patients had complications and underwent revision surgery. The complications we encountered were deep infection in a 60 year-old female patient with type III Garden classification, for which implant was exited and excision arthroplasty done, non-union in a patient for which implant exit and Total Hip Replacement done. In another patient, we encountered implant failure for which implant exit and Total Hip Replacement done.

In 15 patients treated with Dynamic Hip Screw fixation, 7 patients had excellent results, 5 patients had good results, 2 patients had fair results and in 1 patient we encountered the complication of Avascular Necrosis after a 2 year follow up period and the patient wasn't willing for the treatment of AVN.

In our study, higher rate of re-operation were needed in the group of patients treated with cancellous screw fixation as noted in the study conducted by Watson et al. where they recruited 62 patients (31 DHS, 29 cancellous screws, 2 failed consent). In their 1 out of 31 DHS patients and 3 out of 29 cancellous screw patients required re-operation.

Bordetti reported that a large lag screw placed suboptimally could damage the blood supply of the femoral head and result in late AVN. In our study we had a case of AVN following DHS fixation at 2 yr follow up.

In the study conducted by Lee Yih-Shiunn et al where undisplaced femoral neck fractures were treated with cancellous screws and DHS, they reported 97.5% success rate with DHS and only 1 patient needed a change of implant, the results of which are similar to our study.

# CONCLUSION

# CONCLUSION

Aim of our study is about fracture union and not about avascular necrosis. However Avascular necrosis is reported in a case done with DHS, incidence of AVN not reported in other cases, however it is not predictable.

In our study, patients treated with DHS had a higher union rate and lesser rate of complications. This may be attributed to several reasons: DHS produces a **marked compressive effect leading to increased fracture healing and resistance to post-operative fragment spinning, we used a temporary second guide wire before lag screw insertion to control and minimize the rotation of the proximal fragment, the procedure of DHS fixation is simple** when compared to cancellous screw fixation which needs surgical expertise. Hence from our study, we conclude that fracture neck of femur treated with Dynamic Hip Screw fixation gives results with a good functional outcome.

# CASE ILLUSTRATIONS

# CASE ILLUSTRATIONS

## Case 1

Name:Mr. Ramachandran, Age:32/M  IP no:54619

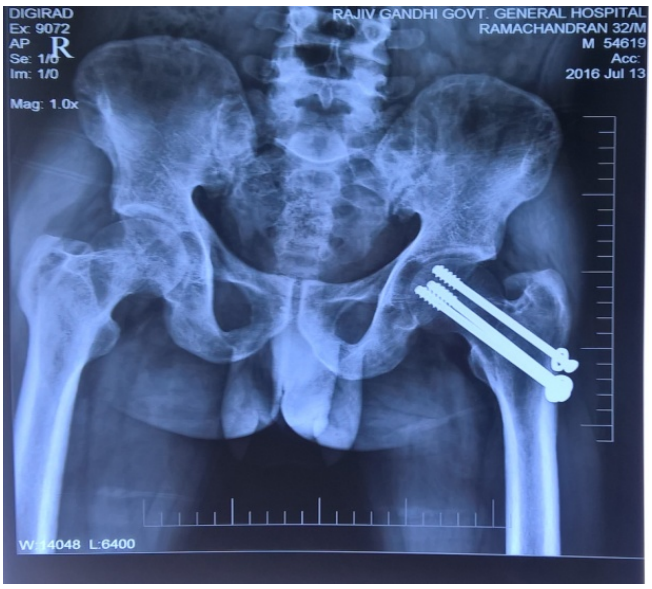
Patient came with complaints of pain in hip after sustaining a injury due to fall from height

On examination, Swelling and tenderness at left hip jt present with restricted range of movements. Xray pelvis with both hips was taken, shows fracture left side neck of femur.

Patient underwent cancellous screw fixation. Post op period uneventful.

Fracture united in 14 weeks.


## Post op X rays




**Case 2**

Name:Mr.Umapathy Age:40/M Ip no:47237

Patient admitted with alleged history of RTA, 2 wheeler hit over tree, and sustained injury to left hip and left knee

Complaint of pain over left hip and knee. Range of Movements painful and restricted at hip joint. X ray pelvis with both hips shows fracture of left neck of femur.

Patient underwent Dynamic Hip Screw fixation. Post operative period was uneventful.

Fracture united at 15 weeks.

Pre op X ray:

Post op X ray

**Follow up X ray:**

**Case 3**

Name: Mr.Elumalai, Age:51/M IP No:

Patient admitted with alleged history of fall from height and sustained injury to right hip

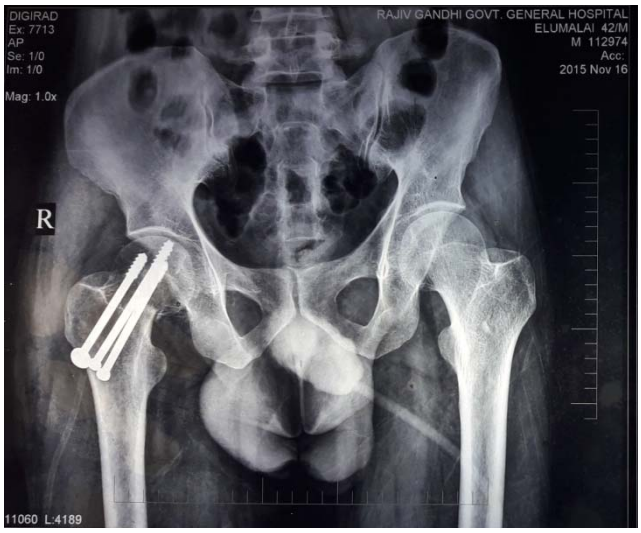
Complaints of pain in right hip and decreased range of movements at right hip. X ray pelvis with both hips show fracture neck of femur right side.

Patient underwent cancellous Screw fixation for right hip. Post op period was uneventful.

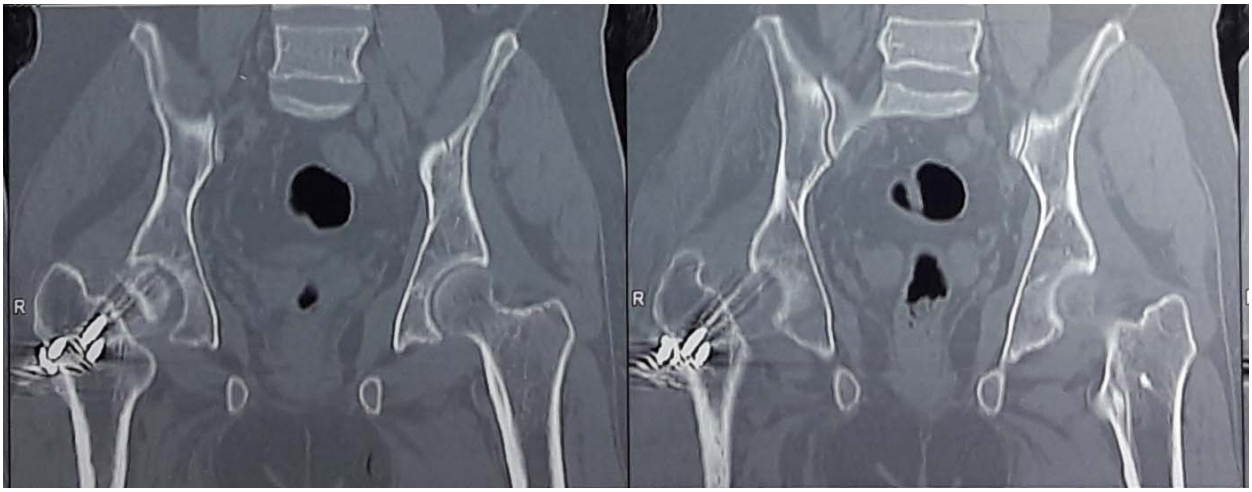
Fracture underwent for non union at 8 months followup.

Pre op x ray

Post op x ray




Follow up x ray





Patient is now being planned for total hip replacement.

**Case 4**

Name: Mr.Devan, Age:65/M IP no:80157

Alleged history of accidental fall in home and sustained injury to the right hip.

Patient complaints of pain right hip and difficulty in using right lowerlimb. Xray of pelvis and both hips show fracture neck of femur right side.

Patient underwent Dynamic hip screw fixation. Patient followed up for 2 years. Now patient developed AVN of right head and sustained fracture neck of femur to left side.

**Pre op x ray:**

**Post op xray:**

2 years Follow up X ray:

Patient now planned for left side Total hip replacement and right side procedure depending on patient willingness and general condition of the patient.

# BIBLIOGRAPHY

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1. **STEPHEN E ROBERTS** time trends and demography mortality after fractured neck of femur English population 1968 to 1998. **BMJ** VOLUME 327 4 OCTOBER 2003 bmj.com.

2. **P. Skinner** Injury **(1989) 20, 291-293** Displaced subcapital fractures of the femur: a prospective randomized comparison of internal fixation, hemiarthroplasty and total hip replacement.

3. **Carlos Roberto Schwartsmann** Volume 2014 (2014), Article ID 257871, 7 pages Dynamic hip screw for the treatment of femor neck fracturs prospective study with 96 patient.

4. **Dr Aaron Reuben D** Volume 15, Issue 3 Ver. IX (Mar. 2016), PP 4044 www.iosrjournals.org . Comparitive Study of Fracture Neck Of Femur Treated With Cannulated Cancellous Screw Fixation And Hemiarthroplasty In Elderly.

5. **Matejka J** Acta Chir Orthop Traumatol Cech. 2005;72(2):98-104. This retrospective study was designed to evaluate the severity and

nature of long-term sequelae of femoral neck fractures in children in relation to the strategy and technique of therapy.

6. **Sumit Banerjee** journal of clinical orthopaedics and trauma 3 (2012) 15 e2 3Proximal femoral fractures: Principles of management and review of literature.

7. **Yue-Lei Zhang** 2016 Jun; 95(24): e3706. PMCID: PMC4998436 Published online 2016 Jun 17Osteonecrosis of the femoral head, nonunion and potential risk factors in Pauwels grade-3 femoral neck fractures.

8. **Marc F. Swiontkowski** Journal of Orthopaedic Research 5~433-444,Raven Press, Ltd., New York*0* 1987 Orthopaedic Research SocietyTorsion and Bending Analysis of Internal Fixation Techniques for Femoral Neck Fractures: the Role of Implant Design and Bone Density.

9. **Marc F. Swiontkowski October 4, 2008** www.jbjs.org Treatment of Femoral Neck Fractures in Young Adults.

10. **Adam Watson** 12 June 2012. Prospective randomized controlled trial comparing dynamic hip screw and screw fixation for undisplaced subcapital hip fractures.

11. **Mohan Lal Nitharwal july 2016** A Prospective Comparative Study of Outcome of Surgical Management of Basicervical Fractures of Femur with Dynamic Hip Screw (DHS) with Derotation Screw and Multiple Cannulated Cancellous (CC) Screw.Volume 3 page no.2119 in ijcmr.

12. **Alobaid A, Harry EJ, Elder GM et al (2004)** Minimally invasive dynamic hip screw: prospective randomized trial of two techniques of insertion of a standard dynamic fixation device. J Orthop Trauma 18:207–212

13. **Asnis SE, Wanek-Sgaglione L (1994)** Intracapsular fractures of the femoral neck. Results of cannulated screw fixation. J Bone Joint Surg Am 76(12):1793–1803

14. **Bolhofner B, Russo P, Carmen B (1999)** Results of intertrochanteric femur fractures treated with a 135-degree sliding screw with a two-hole side plate. J Orthop Trauma 13:5–8

15. **Bray TJ (1997)** Femoral neck fracture fixation, clinical decision making. Clin Orthop 339:20–31

16. **Brodetti A (1960)** The blood supply to the femoral neck and head in relation to the damaging effecting effects of nails and screws. J Bone Joint Surg Br 42:794–801

17. **Chen WC, Yu SW, Tseng IC et al (2005)** Treatment of undisplaced femoral neck fractures in the elderly. J Trauma 58:1035–1039

18. **Clark DI, Crofts CE, Saleh M (1990)** Femoral neck fracture fixation. Comparison of a sliding screw with lag screws. J Bone Joint Surg Br 72:797–800

19. **Cserhati P, Kazar G, Manninger J et al (1996)** Non-operative or operative treatment for undisplaced femoral neck fractures. A comparative study of 122 non-operative and 125 operatively treated cases. Injury 27:583–588

20. **DeLee JC (1991)** Fractures and dislocations of the hip. In Rockwood CA Jr, Green DP, Bucholz RW (eds) Rockwood and Green's fractures in adult. 3rd edn. Philadelphia, PA: Lippincott-Raven: 1481–1651

21. **Eisler J, Cornwall R, Strauss E et al (2002)** Outcomes of elderly patients with nondisplaced femoral neck fractures. Clin Orthop 399:52–58

22. **Heetveld MJ, Raaymakers ELFB, van Walsum ADP et al (2005)** Observer assessment of femoral neck radiographs after

reduction and dynamic hip screw fixation. Arch Orthop Trauma Surg 125:160–165

23. **Heyse-Moore GH (1996)** Fixation of intracapsular femoral neck fractures with a one-hole plate dynamic hip screw. Injury 27:181–183

24. **Johansson T, Jacobsson SA, Iverson I et al (2000)** Internal fixation versus total hip arthroplasty in the treatment of displaced femoral neck fractures: a prospective randomized study of 100 hips. Acta Orthop Scand 71:597–602

25. **Kuokkanen H, Korkala O, Antti-Poika et al (1991)** Three cancellous bone screw versus a screw-angle plate in the treatment of Garden I and II fractures of the femoral neck. Acta Orthop Belg 57:53–57

26. **Lagerby M, Asplund S, Ringqvist I (1998)** Cannulated screws for fixation of femoral neck fractures. Acta Orthop Scand 69:387–391

27. **McLoughlin S, Wheeler D, Rider J et al (2000)** Biomechanical evaluation of the dynamic hip screw with two- and four-hole side plates. J Orthop Trauma 14:318–323

28. **Ort PJ, LaMont J (1984)** Treatment of femoral neck fractures with a sliding compression screw and two Knowles pins. Clin Orthop 190:158–162

29. **Rau FD, Manoli A, Morawa LG (1982)** Treatment of femoral neck fracture with the sliding compression screw. Clin Orthop 163:137–140

30. **Rehnberg L, Olerud C (1989)** Subchondral screw fixation for femoral neck fractures. J Bone Joint Surg Br 71:178–180

31. **Rogmark C, Carlsson A, Johnell O et al (2002)** A prospective randomized trial of internal fixation versus arthroplasty for displaced fractures of the neck of femur. J Bone Joint Surg Br 84:183–188

32. **Selvan VT, Oakley MJ, Rangan A et al (2004)** Optimum configuration of cannulated hip screws for the fixation of intracapsular hip fractures: a biomechanical study. Injury 35:136–141

33. **Singh M, Nagrath AR, Maini PS (1970)** Changes in trabecular pattern of the upper end of the femur as an index of osteoporosis. J Bone Joint Surg Am 52:457–467

34. **Skinner PW, Powles D (1986)** Compression screw fixation for displaced subcapital fracture of the femur. Success or failure? J Bone Joint Surg Br 68:78–82

35. **Sorensen JL, Varmarken JE, Bomler J (1992)** Internal fixation of femoral neck fractures. Dynamic hip and Gouffon screws compared in 73 patients. Acta Orthop Scand 63:288–2

# MASTER CHART

# MASTER CHART FOR DHS

| S.NO | NAME | AGE/SEX | IP NO | TIME INTERVAL | GARDEN CLASSIFICATION | SIDE | PROCEDURE | TIME OF UINON | COMPLICATION | FOLLOW UP DURATION | HARRIS HIP SCORE | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | BASKER | 40/M | 5487 | 18days | TYPE II | L | DHS | 13weeks | Nil | 19 month | 90 | Excellent |
| 2 | SURESH BABU | 30/M | 14605 | 13days | TYPE III | R | DHS | 14weeks | Nil | 18 month | 90 | Excellent |
| 3 | LAXMI | 70/F | 18153 | 14days | TYPE II | R | DHS | 15weeks | Nil | 17month | 75 | Fair |
| 4 | HARIKRISHNAN | 61/M | 109532 | 20days | TYPE IV | L | DHS | 13weeks | Nil | 11month | 95 | Excellent |
| 5 | KUNDIYAMMAL | 50/F | 128578 | 13days | TYPE II | L | DHS | 14weeks | Superficial infection | 9month | 78 | Fair |
| 6 | JANAKIRAMAN | 63/M | 125318 | 18days | TYPE III | L | DHS | 13weeks | Nil | 9month | 85 | Good |
| 7 | ARUMUGAM | 37/M | 2374 | 11days | TYPE I | L | DHS | 13weeks | Nil | 8month | 95 | Excellent |
| 8 | VIJAYARAGAVAN | 55/M | 137021 | 17days | TYPEII | L | DHS | 14weeks | Nil | 8month | 75 | Fair |
| 9 | ANUSHYA | 65/M | 83550 | 21days | TYPE III | L | DHS | 15weeks | Nil | 8month | 80 | Good |
| 10 | CHENNAMMAL | 50/F | 75791 | 17days | TYPE III | L | DHS | 14weeks | Nil | 7month | 90 | Excellent |
| 11 | DEVAN | 65/M | 80157 | 14 days | TYPE III | R | DHS | Patient developed AVN after 2 years of surgery. Patient not willing for surgery.patient now sustained left Neck of Femur fracture. | | | | |
| 12 | PANDIYAMMAL | 72/F | | 16days | TYPE II | L | DHS | 14weeks | Nil | 7month | 85 | Good |
| 13 | SUBRAMANIYAN | 65/M | 29191 | 18days | TYPE II | R | DHS | 15weeks | Nil | 7month | 95 | Excellent |
| 14 | UMAPATHI | 40/M | 47237 | 17days | TYPEIII | L | DHS | 13weeks | Nil | 5month | 90 | Excellent |
| 15 | SANTHA | 65/F | 66106 | 9days | TYPE II | R | DHS | 12weeks | Nil | 4month | 90 | Excellent |

# MASTER CHART FOR CANCELLOUS SCREW FIXATION

| S.NO | NAME | AGE/ SEX | IP NO | TIME INTERVAL | GARDEN CLASSIFICATION | SIDE | PROCEDURE | TIME OF UNION | COMPLICATION | FOLLOW UP DURATION | HARRIS HIP SCORE | REMARK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | MURUGAN | 35/M | 6850 | 9days | TYPE II | R | CCS | 14weeks | _ | 20month | 85 | Good |
| 2 | PRAKASH | 36/M | 21519 | 7days | TYPE II | L | CCS | 13weeks | _ | 18month | 80 | Good |
| 3 | LALITHA | 23/F | 26489 | 20days | TYPE II | L | CCS | 13weeks | _ | 18month | 85 | Good |
| 4 | VELATHUR | 23/M | 41021 | 18days | TYPEIII | R | CCS | 6 weeks follow implants failure P/THR | | | | |
| 5 | RAJITH | 24/M | 106001 | 7days | TYPE II | R | CCS | 13weeks | - | 12month | 90 | Excellent |
| 6 | VASANTH | 21/M | 1780 | 8days | TYPE II | R | CCS | 13weeks | _ | 18month | 85 | Good |
| 7 | ELUMALAI | 51/M | 11928 | 21days | TYPE III | R | CCS | 8 month follow up non union implant exit THR | | | | |
| 8 | RAMACHANDRAN | 32/m | 54619 | 3days | TYPE II | L | CCS | 13weeks | _ | 7month | 90 | Excellent |
| 9 | HARIBABU | 36/M | 101210 | 20days | TYPE II | L | CCS | 14 weeks | _ | 7month | 75 | Fair |
| 10 | PRAKASH | 17/M | 46730 | 8days | TYPE I | L | CCS | 13weeks | - | 5month | 90 | Excellent |
| 11 | SUSEELA | 47/F | 31743 | 21days | TYPE III | R | CCS | Infected-procedure implant exit and excision orthroplasty | | | | |
| 12 | SARAVANAN | 40/M | 20233 | 21days | TYPE II | R | CCS | 14weeks | - | 8month | 80 | Good |
| 13 | VIMALA | 50/F | 57600 | 20days | TYPE II | L | CCS | 15weeks | - | 4month | 80 | Good |
| 14 | MARIYAMA | 45/F | 48238 | 21days | TYPE III | L | CCS | 14weeks | - | 4month | 75 | Fair |
| 15 | MERSELIN | 48/M | 57631 | 12days | TYPE I | R | CCS | 13weeks | _ | 5month | 90 | Eecellent |

# ANNEXURE

# INSTITUTIONAL ETHICS COMMITTEE
# MADRAS MEDICAL COLLEGE, CHENNAI 600 003

EC Reg.No.ECR/270/Inst./TN/2013
Telephone No.044 25305301
Fax: 011 25363970

## CERTIFICATE OF APPROVAL

To
Dr.Venkatesh.S.,
Post Graduate in M.S. Orthopaedic Surgery
Madras Medical College
Chennai 600 003

Dear Dr.Venkatesh.S.

The Institutional Ethics Committee has considered your request and approved your study titled **"COMPARATIVE ANALYSIS BETWEEN DYNAMIC HIP SCREW AND CANCELLOUS SCREW FIXATION FOR NECK OF FEMUR FRACTURE"- NO. 13042016.**

The following members of Ethics Committee were present in the meeting hold on **05.04.2016** conducted at Madras Medical College, Chennai 3

| | |
|---|---|
| 1.Dr.C.Rajendran, MD., | :Chairperson |
| 2.Dr.Isaac Christian Moses,MD.Ph.D.Dean(FAC)MMC,Ch-3 | :Deputy Chairperson |
| 3.Prof.Sudha Seshayyan,MD., Vice Principal,MMC,Ch-3 | : Member Secretary |
| 4.Prof.B.Vasanthi,MD., Prof.of Pharmacology.,MMC,Ch-3 | : Member |
| 5.Prof.P.Raghumani,MS, Prof. of Surgery,RGGGH,Ch-3 | : Member |
| 6. Prof.Md.Ali,MD.,DM.,HOD-MGE, MMC,Ch-3 | : Member |
| 7.Prof.Baby Vasumathi, Director, Inst. of O&G,Ch-8 | : Member |
| 8.Prof.K.Ramadevi,MD, Director,Inst.of Bio-Chem,MMC,Ch-3 | : Member |
| 9.Prof.M.Saraswathi,MD.,Director, Inst.of Path,MMC,Ch-3 | : Member |
| 10.Prof.Srinivasagalu,Director,Inst.of Int.Med.,MMC,Ch-3 | : Member |
| 11.Tmt.J.Rajalakshmi, JAO,MMC, Ch-3 | : Lay Person |
| 12.Thiru S.Govindasamy, BA.,BL,High Court,Chennai | : Lawyer |
| 13.Tmt.Arnold Saulina, MA.,MSW., | :Social Scientist |

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

22/4/16

Member Secretary - Ethics Committee

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE
CHENNAI-600 003

# ஆராய்ச்சி ஒப்புதல் கடிதம்

**ஆராய்ச்சி தலைப்பு**

**பீமர் கழுத்து எலும்பு முறிவை கான்சலஸ் திருகாணி மற்றும் டைனமிக் திருகாணி மூலம் அறுவை சிகிச்சை செய்தல்- ஒப்பீட்டு பகுப்பாய்வு**

ராஜீவ் காந்தி அரசு பொது மருத்துவமனைக்கு வரும் நோயாளிகளிடம் பீமர் கழுத்து எலும்பு முறிவை கான்சலஸ் திருகாணி மற்றும் டைனமிக் திருகாணி மூலம் அறுவை சிகிச்சை செய்தல்- ஒப்பீட்டு பகுப்பாய்வு நடைபெறுகிறது.

| | | | |
|---|---|---|---|
| பெயர் | : | தேதி | : |
| வயது | : | உள் நோயாளி எண் | : |
| பால் | : | ஆராய்ச்சி சேர்க்கை எண் | : |

இந்த ஆராய்ச்சியின் விவரங்களும் அதன் நோக்கங்களும் முழுமையாக எனக்கு தெளிவாக விளக்கப்பட்டது.

எனக்கு விளக்கப்பட்ட விஷயங்களை நான் புரிந்துகொண்டு எனது சம்மதத்தை தெரிவிக்கிறேன்.

இந்த ஆராய்ச்சியில் பிறரின் நிர்பந்தமின்றி என் சொந்த விருப்பத்தின்பேரில் பங்கு பெறுகின்றேன். இந்த ஆராய்ச்சியில் இருந்து நான் எந்நேரமும் பின்வாங்கலாம் என்பதையும் அதனால் எந்த பாதிப்பும் ஏற்படாது என்பதையும் நான் புரிந்துகொண்டேன்.

நான் இந்த ஆராய்ச்சியின் விபரங்களைக் கொண்ட ஆராய்ச்சித் தகவல் தாளைப் பெற்றுக் கொண்டேன்.

இதன் மூலம் எந்த பின்விளைவும் ஏற்படாது என்று மருத்துவர் மூலம் தெரிந்து கொண்டு, நான் என்னுடைய சுய நினைவுடனும் மற்றும் முழு சுதந்திரத்துடனும் இந்த மருத்துவ ஆராய்ச்சியில் என்னை சேர்த்துக்கொள்ள சம்மதம் தெரிவிக்கிறேன்.

**கையொப்பம்**

# ஆராய்ச்சி தகவல் தாள்

ராஜீவ் காந்தி அரசு பொது மருத்துவமனைக்கு வரும் நோயாளிகளிடம் பீமர் கழுத்து எலும்பு முறிவை கான்சலஸ் திருகாணி மற்றும் டைனமிக் திருகாணி மூலம் அறுவை சிகிச்சை செய்தல்- ஒப்பீட்டு பகுப்பாய்வு நடைபெறுகிறது.

முடிவுகளை அல்லது கருத்துகளை வெளியிடும்போதோ அல்லது ஆராய்ச்சியின் போதோ தங்களது பெயரையோ அல்லது அடையாளங்களையோ வெளியிட மாட்டோம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியில் பங்கேற்பது தங்களுடைய விருப்பத்தின் பேரில் தான் இருக்கிறது. மேலும் நீங்கள் எந்நேரமும் இந்த ஆராய்ச்சியிலிருந்து பின்வாங்கலாம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த சிறப்பு சிகிச்சையின் முடிவுகளை ஆராய்ச்சியின்போது அல்லது ஆராய்ச்சியின் முடிவின் போது தங்களுக்கு அறிவிக்கப்படும் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

ஆராய்ச்சியாளர் கையொப்பம் பங்கேற்பாளர் கையொப்பம்

நாள் :
இடம் :

## PATIENT CONSENT FORM

Study Detail : **Comparative Analysis Between Dynamic Hip screw and Cancellous Screw fixation for fracture neck of femur**

Study Centre : Rajiv Gandhi Government General Hospital, Chennai.
Patient's Name :
Patient's Age :
Identification Number :

Patient may check (√) these boxes

a) I confirm that I have understood the purpose of procedure for the above study. I have the opportunity to ask question and all my questions and doubts have been answered to my complete satisfaction. ☐

b) I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving reason, without my legal rights being affected. ☐

c) I understand that sponsor of the clinical study, others working on the sponsor's behalf, the ethical committee and the regulatory authorities will not need my permission to look at my health records, both in respect of current study and any further research that may be conducted in relation to it, even if I withdraw from the study I agree to this access. However, I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from this study. ☐

d) I agree to take part in the above study and to comply with the instructions given during the study and faithfully cooperate with the study team and to immediately inform the study staff if I suffer from any deterioration in my health or well being or any unexpected or unusual symptoms. ☐

e) I hereby consent to participate in this study. ☐

f) I hereby give permission to undergo detailed clinical examination, Radiographs & blood investigations as required. ☐

Signature/thumb impression

Patient's Name and Address:

Signature of Investigator

Investigator's Name:

( Dr. Venkatesh S.)

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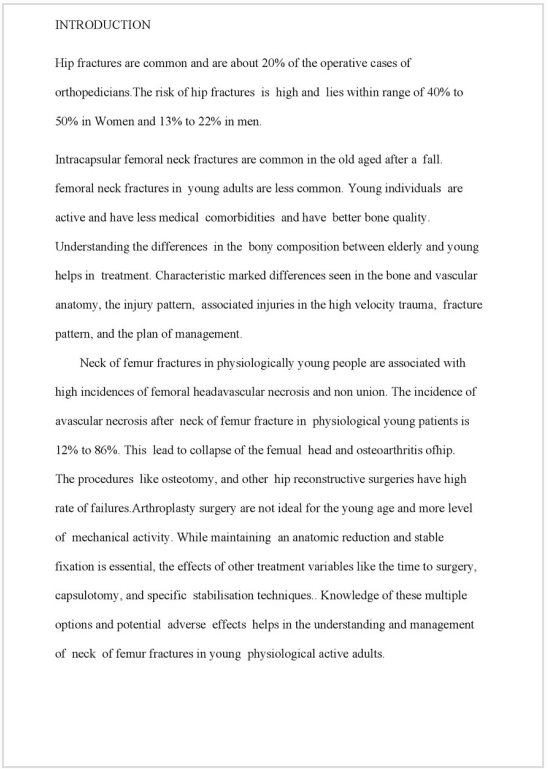
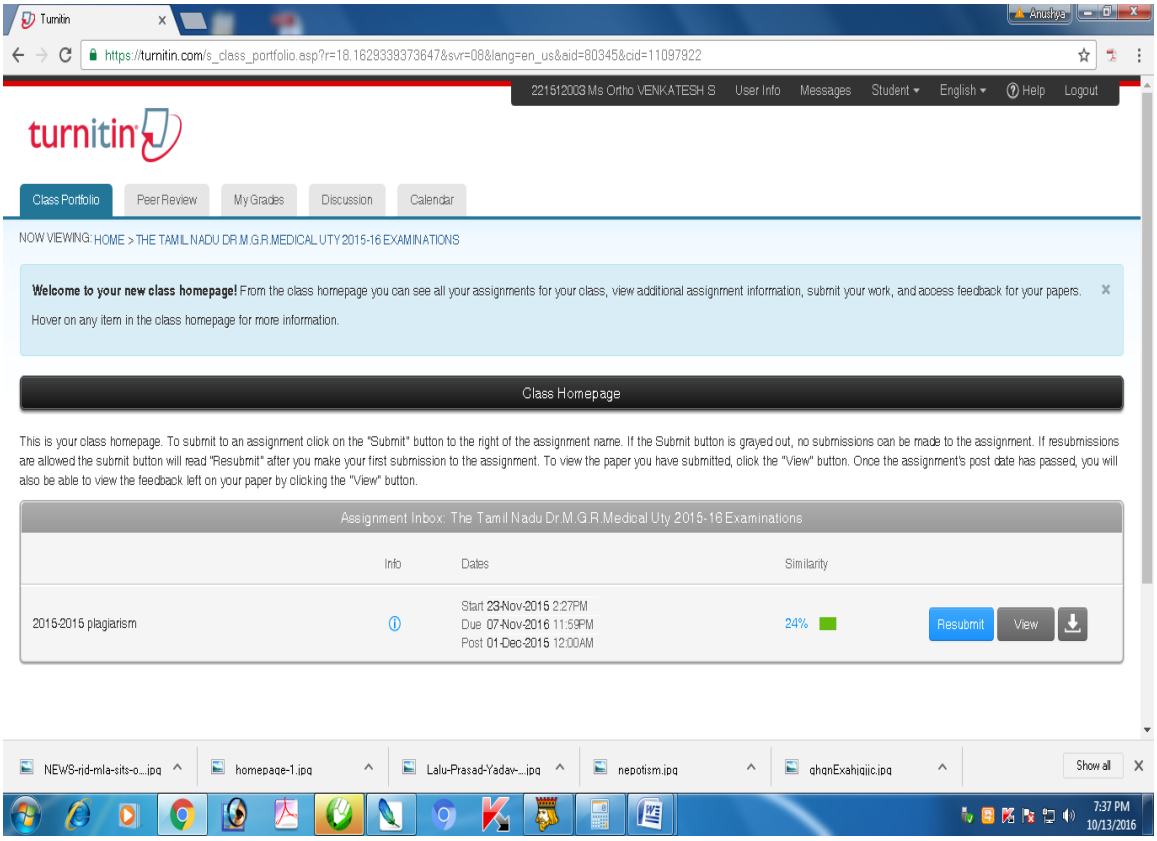


INTRODUCTION

Hip fractures are common and are about 20% of the operative cases of orthopedicians.The risk of hip fractures is high and lies within range of 40% to 50% in Women and 13% to 22% in men.

Intracapsular femoral neck fractures are common in the old aged after a fall. femoral neck fractures in young adults are less common. Young individuals are active and have less medical comorbidities and have better bone quality. Understanding the differences in the bony composition between elderly and young helps in treatment. Characteristic marked differences seen in the bone and vascular anatomy, the injury pattern, associated injuries in the high velocity trauma, fracture pattern, and the plan of management.

Neck of femur fractures in physiologically young people are associated with high incidences of femoral headavascular necrosis and non union. The incidence of avascular necrosis after neck of femur fracture in physiological young patients is 12% to 86%. This lead to collapse of the femual head and osteoarthritis ofhip. The procedures like osteotomy, and other hip reconstructive surgeries have high rate of failures.Arthroplasty surgery are not ideal for the young age and more level of mechanical activity. While maintaining an anatomic reduction and stable fixation is essential, the effects of other treatment variables like the time to surgery, capsulotomy, and specific stabilisation techniques.. Knowledge of these multiple options and potential adverse effects helps in the understanding and management of neck of femur fractures in young physiological active adults.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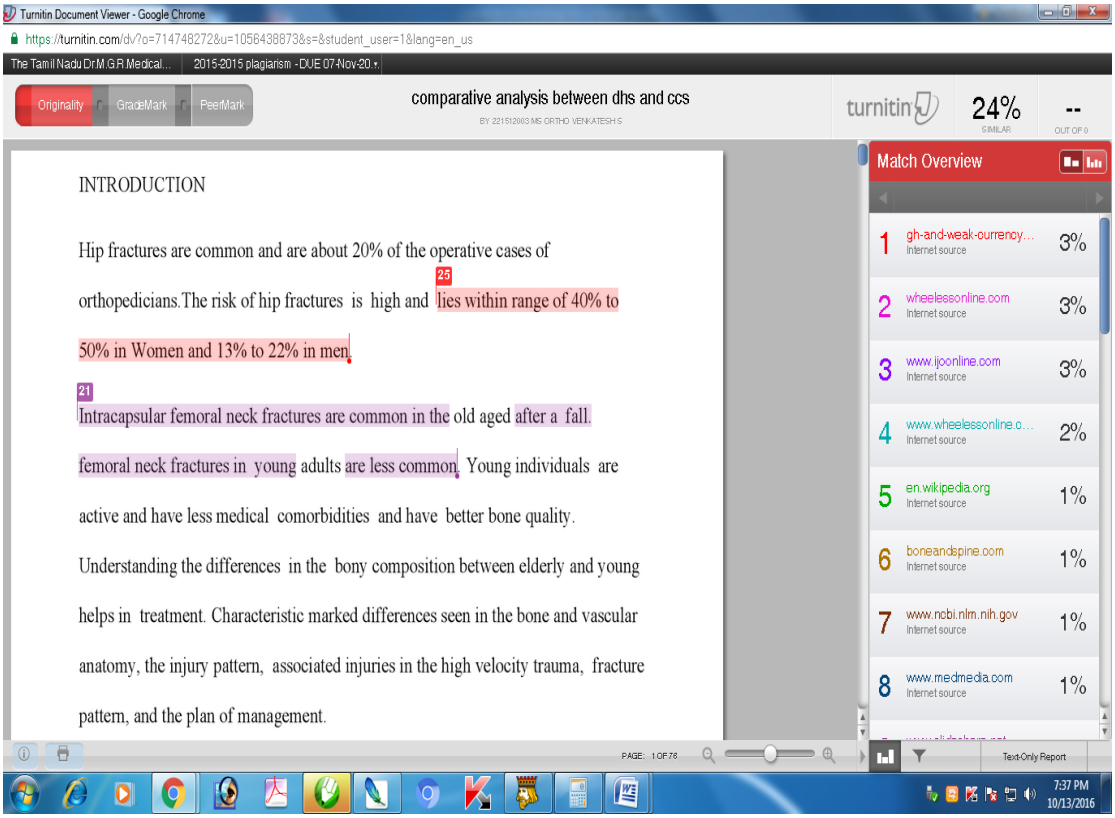
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INTRODUCTION
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